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NATAL PLANTS.

VOL. 2.—PART 1.

GOVERNMENT BOTANICAL GARDENS
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GRASSES.

. . EDITED BY . .

J. MEDLEY WOOD, A.L.S.,

CURATOR OF NATAL BOTANIC GARDENS, DURBAN,

—— AND OF ——

NATAL GOVERNMENT HERBARIUM.

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Imperata arundinacea, *Cyr.*

GOVERNMENT BOTANICAL GARDENS
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PLATE 101.

IMPERATA ARUNDINACEA (Cyr. Pl. Rar. Neap. fasc. ii. 26, t. 11, and in Usteri, Ann. Bot. xiii. 61).

PERENNIAL, rather coarse, few culms in a stool; on jointed creeping root-stocks, which are completely clothed with imbricate, leafy, veiny scales.

CULMS, 1½-4 feet long, erect, 3-4-noded, glabrous. Sheaths rather loose, glabrous, the lowest at length breaking up into fibres; ligules membranous, short, hairy. Blades linear from a very narrow base, tapering to an acute point, the lowest ½-1 foot long, by 1-2 lines broad, the upper very short, rigid, usually convolute, glabrous or bearded at the base, smooth below, margin scabrid, midrib stout.

PANICLE spiciform, 2-8 inches long, cylindric, very dense, branches and branchlets very numerous, crowded, appressed, pedicels fine, with clavate tips, ½-1½ line long, with fine long hairs below.

SPIKELETS about 2½ lines long, pale or purplish, enveloped by hairs 5-6 lines long. Glumes ovate-oblong, to ovate-lanceolate, obtuse or subobtuse, with the tips ciliate, usually 5-7-nerved. Valves, *lower* oblong, obtuse, denticulate, ciliate, nerveless; *upper* ovate, acute, glabrous, nerveless. Anthers 1½-2¼ lines long. Stigmas 1½-2½ lines long, purple.

Habitat: NATAL. Coast districts generally. Dundee, *W. E. Green*, 70; Zululand, *H. D. Jenkinson*, 66.

Drawn and described from specimens gathered near Durban, February, 1899.

This genus includes five closely allied species, all natives of warm countries. The present species is common in moist ground in the coast districts, and extends to the uplands and Zululand. It has little if any value as a pasture grass, and its presence is, I think, usually indicative of a moist subsoil, but further iuformation on this point is desirable. I have not been able to ascertain its native name. Baron F. v. Mueller says of it:—"The Lalang grass of India. Structurally almost a Sugar Cane in miniature. Valuable for binding sand, especially in wet localities. Available also for thatching, and for litter of resisting qualities. Pretty in table bouquets. Apt to become irrepressible in cultivated ground. Browsed on by pasture animals, though harsh; ought to be suitable for ensilage."

Fig. 1, Plant reduced; 2, lower glume; 3, upper glume; 4, lowest valve; 5, upper valve; 6, pale; 7, ovary, stamens, style and stigmas; 8, branchlet with spikelets; 9, pedicels after disarticulation. *Except fig. 1, all enlarged.*

PLATE 102.

SACCHARUM MUNROANUM (Hack. Androp. in DC. Mongr. Plan. vi. 124.)

CULMS 2 feet long, 3-noded.

LEAVES, lower crowded. Sheaths rather lax, scantily hairy at the nodes, otherwise glabrous, the lowest shining as if lacquered; ligule short with hairs from the base behind, otherwise glabrous. Blades narrow, linear, acute, flat, 4-5 inches long, by 2 lines (or by less than 1 line in the more or less convolute innovation leaves), rigid, puberulous on both sides, margin smooth.

PANICLE oblong, 4-5 inches long, dense, fulvous or ferruginous, shining. Racemes $\frac{1}{2}$ to almost 1 inch long, rather stout; joints and pedicels stout, ciliate.

SPIKELETS crowded, lanceolate. *Sessile spikelet* 2-2$\frac{1}{2}$ lines long, enveloped by rigid hairs. Glumes, *lower* chartaceous, entire, subobtuse, 2-keeled and 4-nerved between the keels, which are long ciliate above the middle; *upper* more acute, 1-3 nerved, ciliate along the margins and on the keel above the middle. Valves, *lower* 1$\frac{1}{2}$-1$\frac{3}{4}$ line long, lanceolate; *upper* very small, ovate, nerveless, tips ciliate. Pale 0. Anthers 1 line long. Grain obovoid, globose, $\frac{1}{2}$ line long. *Pedicelled spikelets* similar but smaller (1$\frac{1}{2}$-1$\frac{3}{4}$ line long), enveloping hairs more copious. Anthers rudimentary, very minute.

Habitat: NATAL. Drakensberg, near Coldstream, 5500 feet, *Rehmann* 6876; Umpumulo, in marshes, 2000 feet, *Buchanan* 212; Greytown, *Wood* 7357.

Drawn and described from specimens gathered near Greytown, *Wood* 7357.

The genus Saccharum includes 12 species widely distributed in tropical and subtropical regions of the Old World, one or two only being found in America and West India Islands. The above described species is so far as at present known, the only South African one, and is confined to South Africa. It has been hitherto known as *Eriochrysis pallida*, Munro. The best known species of this genus is *S. officinarum*, the "Sugar Cane," but in outward appearance there is little similarity between the two plants.

Fig 1, Plant about natural size; 2, spikelets (sessile and pedicelled) in position on rhachilla; 3, lowest glume of sessile spikelet; 3a, lowest glume of pedicelled spikelet; 4, upper glume: 4a, same, side view; 5, lower valve; 6, upper valve; 7, lodicules, ovary, style, and stamens of sessile spikelet; 8, same of pedicelled spikelet. *Except fig. 1, all enlarged.*

Saccharum munroanum, *Hack.*

Pollinia nuda, Linn.

PLATE 103.

Pollinia nuda (Trin. Androp. in Mém. Ac. Pétersb. sér. vi. ii. 307).

Annual.—Culms very slender, decumbent, rooting, branched below, 2-5 feet long, many-noded, grooved.

Leaves : Sheaths as long as, or the upper shorter than, the internodes, terete, tight, finely hairy or glabrescent. Ligules membranous, glabrous. Blades spreading, lanceolate from a constricted base, acuminate, 1-2½ inches long by 2-7 lines wide, thin, often flaccid, glabrous or with a few tubercle-based hairs.

Racemes (false spikes) 3-6, somewhat distant on a common axis, very slender, flexuous, 1-4 inches long, green, joints equalling or exceeding the spikelets, glabrous. Pedicels like the joints but shorter.

Spikelets rather distant, linear-lanceolate, 2 lines long, minutely bearded at the base. Glumes membranous, *lower* bicuspidate, dorsally concave, 2-keeled, keels scaberulous, *upper* acuminate, 1-nerved, obscurely keeled, ciliolate. Valves, *lower* empty, linear-lanceolate, 1½ line long, hyaline, glabrous, nerveless ; *upper* linear very narrow, 1 line long, hyaline, 1-nerved, awn terminal, finely capillary, flexuous, 6-9 lines long. Pale 0. Anthers ½ line long. Grain 1 line long.

Habitat : Natal. Riet Vlei in bush, 6000 feet, *Buchanan*, 292.

Drawn from Buchanan's specimen in Natal Government Herbarium.

Apparently a somewhat rare species in Natal since it is not reported as having been gathered in any other locality, and Buchanan's is the only specimen in the Government Herbarium. It appears to be plentiful in India, but I cannot learn that it is of much value as a pasture grass.

Fig. 1, Plant about natural size ; 2, lowest glume, back view ; 2a, same, front view ; 3, upper glume, back view ; 3a, same, side view ; 4, lower valve ; 5, upper valve ; 6, ovary, stamens, stigma, and lodicules ; 7, rhachis and spikelets. *Except fig. 1, all enlarged.*

PLATE 104.

ISCHÆMUM FASCICULATUM (Brongn. Voy. Coq. Bot. 73). var. arcuatum (Hack. Androp. in DC. Monogr. Phan. vi. 235).

PERENNIAL.—CULMS ascending or suberect from a slender creeping rhizome, more or less branched and fascicled near the base, or simple ; 1-3 feet long, rather slender, glabrous, 5-many noded. Sheaths equalling or exceeding the internodes, subterete, glabrous, rarely hairy ; ligules minute, truncate, ciliate. Blades linear-lanceolate, setaceously acuminate ; 3-8 inches long by 3-6 lines broad, flat, quite glabrous, or hairy on the back near base, smooth, midrib white.

RACEMES (false spikes) fascicled, 2-5, stout, straight or flexuous, 2-5 inches long, hairy ; joints stout, triquetrous, $1\frac{1}{4}$-$1\frac{1}{2}$ line long, slightly curved, keel (outer angle) ciliate with yellowish hairs.

SPIKELETS 2-nate, 1 subsessile the other pedicelled. *Subsessile spikelets* $2\frac{1}{2}$-3 lines long, reddish above, pedicel $\frac{1}{2}$ line long or shorter, bearded at the base. Glumes, *lower* lanceolate-oblong, acutely and shortly 2-toothed, coriaceous below, flat and more or less distinctly 5-ribbed on the back, scaberulous, scantily hairy, keels winged near the tips, scabrid, intracarinal nerves 5-9 ; *upper* slightly longer than the lower, lanceolate, acuminate, mucronate, 3-5-nerved, keeled above. Valves, *lower* lanceolate, almost as long as the subtending glume, rigidly membranous, glabrous, 3-nerved, with an almost equal pale and a male flower ; *upper* oblong, hyaline, deeply 2-fid, 2 lines long, delicately membranous, 3-nerved, lobes very broad, ciliate ; awn 4-5 lines long, twisted below. Pale as long as, or slightly longer than, the valve, acute. Anthers 1 line long. *Pedicelled spikelets* $2\frac{1}{2}$ lines long, reddish, pedicel 2 lines long, more or less hairy on the back. Lower glume lanceolate, boat-shaped, keeled, 7-9-nerved, loosely hairy ; the rest as in the subsessile spikelets.

Habitat : NATAL. Coast districts generally, often in woods and marshy places. Near Durban, *Buchanan* 32 ; 109 ; *Wood* 5945 ; near Umzimkulu, *Drège* ; Umpumulo, *Buchanan* 209 ; without precise locality, *Gerrard* 679 ; *Harvey* 49 ; Zululand, *Jenkinson* 87.

Figured from specimens gathered near Durban, February, 1899.

In Harvey's genera of South African plants, this is quoted as *Spodiopogon arcuatus*, Nees. Good for pasture, according to Mr. Celliers, per Mr. W. E. Green.

Fig. 1, Plant about natural size ; 2, rhachis with sessile and subsessile spikelets. *Sessile spikelet* :—3, Lower glume ; 3a, same, back view ; 4, upper glume, side view ; 5, lower valve ; 6, pale of same ; 7, perfect stamens and lodicules ; 8, upper valve ; 9, pale of same ; 10, ovary, style and stigmas. *Except fig. 1, all enlarged.*

schæmum fasciculatum, Brongn. var arcuatum, *Hack.*

Rottboellia compressa, Linn. var; fasciculata, *Hack.*

PLATE 105.

ROTTBŒLLIA COMPRESSA (Linn. f. Suppl. 114), var. fasciculata (Hack. Androp. in DC. Monogr. Phan. vi. 286).

PERENNIAL.—CULMS erect from a decumbent rooting base, branched, compressed, glabrous, 1-5 feet long. Sheaths shorter than the internodes, compressed, keeled, often ciliate at the mouth, otherwise glabrous. Ligules membranous, very short, ciliate. Blades linear, gradually tapering, acute, very variable in length and width, uppermost almost suppressed, somewhat rigid, glabrous.

RACEMES often fascicled, rather stout, straight or curved, with the appearance of true spikes owing to the pedicels of the upper spikelets being adnate to the contiguous joint ; more or less fragile.

SPIKELETS linear-oblong to oblong, 3-3½ lines long, glabrous. Glumes equal, *lower* coriaceous, constricted below the obtuse tips, or in the pedicelled spikelet more acuminate, finely 7-9-nerved; *upper* broadly lanceolate, acuminate, membranous and 3-nerved in the sessile, sub-chartaceous, and 5-7-nerved in the pedicelled spikelets. Valves sub-equal, nerveless, 2-2½ lines long. Pale linear, 1-1¼ line long, lodicules 2, cuneate. Stamens 3. Anthers 1-1½ line long. Stigmas generally laterally exserted. Grain broadly oblong.

Habitat : NATAL. By the Umlaas River, *Krauss ;* by streamlets near Umpumulo, *Buchanan* 198 ; without precise locality, *Buchanan* 74 ; *Gerrard* 677 ; near Dundee, *W. E. Green* 31 ; near Durban, *Wood* 7526.

Figured from *Wood's* specimen No. 7526.

Throughout the warm countries of both hemispheres, in many localities evidently introduced. The type through India to S.W. China. Of this grass Baron F. v. Mueller says :—" This perennial grass, though somewhat harsh, is recommendable for moist pastures, and will retain a beautiful green throughout the year in dry climes ; highly esteemed by graziers in Gippsland ; it is not injured by moderate frost." Mr. Cellier of Dundee says that it is good for pasture.

Fig. 1, Portion of plant, natural size ; 2, rhachis with sessile and pedicelled spikelets ; 3, lower glume ; 4, upper glume of sessile spikelet ; 4a, upper glume of pedicelled spikelet ; 5, lower valve ; 6, upper valve ; 7, pale ; 8, ovary, style, stigmas, stamens, and lodicules. *Except fig. 1, all enlarged.*

PLATE 106.

ERIANTHUS CAPENSIS (Nees. Fl. Afr. Austr. 93, excl. var. B).

CULMS up to 3 feet and more long, stout, sheathed nearly all along, glabrous. Sheaths glabrous or scantily and appressedly hirsute near the margins. Ligules about 1 line long, rounded. Blades broadly linear from a narrow base, tapering to a long acute point, flat, firm, smooth, green, densely bearded at the base inside, otherwise glabrous; 1-3 feet long, 4-6 lines wide.

PANICLE 1-1½ foot long, linear-oblong, usually sheathed at the base, much branched, branches and branchlets sub-erect, filiform, like the rhachis quite glabrous, the lowest 3-4 rarely 6 inches long.

RACEMES obscurely articulate, tough, joints equalling or exceeding the spikelets, bearded at base. Pedicels unequal, one very short, the other almost as long as the spikelet, both filiform.

SPIKELETS oblong to oblong-lanceolate, pale or reddish brown, loosely hairy, 2-2½ lines long, the hairs about ½ line long. Glumes chartaceous, the lower minutely 2-toothed, usually with 2 intracarinal nerves, the upper broadly lanceolate, boat-shaped, sub-acute, 3-nerved, keeled. Valves, *lower* lanceolate, about as long as the lower glume, hyaline above, 1-3-nerved, ciliate; *upper* linear-oblong, acutely bifid, 3-nerved, ciliate, 1-1¼ line long. Awn 2-4 lines long; column short. Pale very small, long, ciliate. Lodicules cuneate, ciliate.

Habitat: NATAL. Among reeds by Umlaas River, *Krauss* 159; feeder of Tugela River, 1000 feet alt., *Buchanan* 271; Zululand, *Jenkinson* 82.

Figured from Jenkinson's specimens, the only ones in the Government Herbarium.

A genus of 20 or more species, mostly tropical, the one here described being so far as at present known the only one found in Natal. It is a coarse grass and of little if any use for pastures. Usually, I think, found in moist places, and in large clumps. The native name is um-Tala, and it is often used by them for thatching purposes.

Fig. 1, Portion of inflorescence and leaf, natural size; 2, lower glume; 3, upper glume; 4, lower valve; 5, upper valve; 6, stamens and pistil. *Except fig. 1, all enlarged.*

Erianthus capensis Nees var. villosa Stapf

Trachypogon polymorphus, Hack.

var. apogon, Hack.

PLATE 107.

TRACHYPOGON POLYMORPHUS (Hack. in Mart. Fl. Bras. II. iii. 263), var. capensis (Hack. Androp. in DC. Monogr. Phan. vi. 326).

CULMS erect, slender, simple, terete, glabrous, few-noded, $1\frac{1}{2}$-3 feet long.

LEAVES mainly crowded near the base. Sheaths terete, tight, generally exceeding the internodes, bearded at the nodes, otherwise glabrous or scantily and fugaciously hairy. Ligules firm, up to 2 lines long. Blades very narrow, linear, tapering to a long setaceous point, usually convolute, glabrous or hirsute at the base, rarely hairy all over ; 4-10 inches long, $\frac{3}{4}$-2 lines wide.

RACEMES solitary, straight or sub-flexuous, 3-7 inches long. Rhachis subterete, glabrous. Male spikelets subsessile, oblong, hairy, 3-4 lines long. Glumes, *lower* obtuse or 2-toothed, keels crested, ciliolate, intracarinal nerves about 7, margins very narrowly inflexed ; *upper* linear-oblong, subacute, subglabrous, 3-nerved, margins softly ciliate. Stamens 3. Anthers $1\frac{1}{2}$-2 lines long. Perfect spikelets $3\frac{1}{2}$-$4\frac{1}{2}$ lines long. Pedicels very slender, about $1\frac{1}{2}$ line long, scantily long-hairy. Glumes, *lower* oblong-linear, minutely truncate, ciliate near the membranous reddish tips, otherwise more or less hairy, nerves 8-11, transversely anastomosing, callus 1 line long ; *upper* lanceolate-linear, obtuse, strongly 3-nerved, scantily hairy above. Awn of upper valve $1\frac{1}{2}$-$2\frac{1}{2}$ inches long, softly hairy with hairs decreasing upwards, or the bristle scabrid.

Habitat : NATAL. Umpumulo, *Buchanan* 153 ; Riet Vlei, *Buchanan* 154, 155 ; Inanda, *Wood* 1621 ; and without precise locality, *Buchanan* 125, *Gerrard* 476 ; Zululand, *Jenkinson* 22 ; Zululand, *Swanfield* ; Dundee, *W. E. Green* 77, 80, 91.

Figured from Swanfield's specimen.

The plant above described is the only species of the genus, and extends by its many varieties through tropical and sub-tropical America. In Africa it is found from Cape Colony to the Congo, and it also occurs in Madagascar. The twisted awn as shown in the figure was only seen in few specimens ; it appears to be usually straight.

Fig. 1, Plant about natural size ; 2, rhachis with long and short pedicelled spikelets ; 3, *long pedicelled spikelet*, lower glume : 4, upper glume ; 5, ovary, style, stigma, stamens and lodicules ; 6, upper valve, *short pedicelled spikelet* ; 7, lower glume, back view ; 8, same, front view ; 9, upper glume ; 10, lower valve ; 11, stamen, imperfect ovary and lodicule ; 12, upper valve. *Except fig. 1, all enlarged.*

PLATE 108.

ELIONURUS ARGENTEUS (Nees. Fl. Afr. Aus. 95).

Densely cæspitose ; innovation shoots intravaginal.

CULMS slender, simple, rarely with a lateral flowering branch from the upper part ; 1-2 feet long, more or less compressed below, glabrous, 2-3-noded. Leaves mainly crowded at the base ; lower sheaths compressed, villous at the very base, appressedly and usually fugaciously hirsute above, or glabrous except near the mouth ; upper ones terete, tight, shorter than the internodes, the uppermost sometimes tumid with a minute blade. Ligules truncate, ciliolate, with long hairs from behind. Blades very narrow, linear, acute, generally tightly convolute and filiform ; 4-12 inches long by about 1 line wide, erect, rigid, sulcate, flexuous or curved, glabrous or hirsute at the base.

RACEME (false spike) 3-6 inches long, rather stout, straight or flexuous, whitish-silky, joints rather stout or slender to 2 lines long, long and densely villous on the back. *Sessile spikelets* lanceolate, acuminate, 4-5 lines long. Glumes, *lower* herbaceous to chartaceous, bicuspidate, villous to subglabrous on the back, intracarinal nerves about 6, evanescent below, keels acute, long and densely ciliate in the lower part with tubercle-based tufts of hairs, and with oil glands nearly all along ; callus short, obtuse, hairy ; *upper* acute, 3-nerved, pubescent along the fine prominent keel, margins softly ciliate. Valves, *lower* lanceolate, $2\frac{1}{2}$ lines long, 2-nerved ; *upper* oblong-lanceolate, 2 lines long, 3-nerved ; margins of both softly ciliate. Pale very minute. Anthers 2 lines long. *Pedicelled spikelets* $2\frac{1}{2}$-3 lines long, pedicels up to 2 lines long like the joints. Glumes, *lower* entire or sub-entire, one margin inflexed, the other spreading, intracarinal nerves 5-6 ; *upper* 3-5-nerved, otherwise as in the sessile spikelet except the sex.

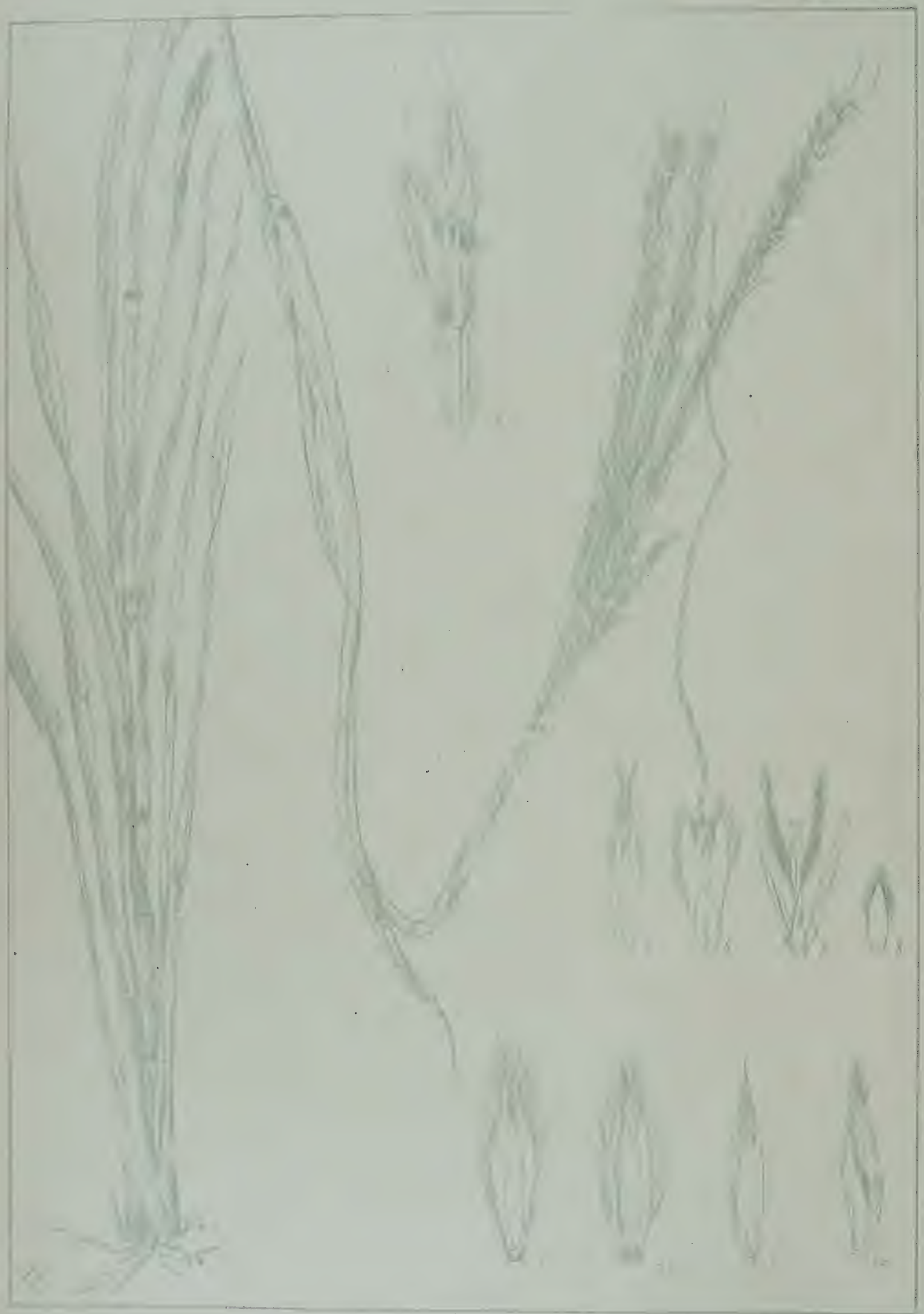
Habitat : NATAL. Umpumulo and Riet Vlei, *Buchanan* 161 ; without precise locality, *Gerrard* 768, *Buchanan* 52 ; Zululand, *Buchanan* 161a ; Mooi River, *Mason* 3, 43 ; Dundee, *W. E. Green* 68 ; Zululand, *Jenkinson* 94.

Figured from the specimen sent by Mr. W. E. Green, compared also with Buchanan's 161 and Mason's 3, all of which agree except in size of plant and length of inflorescence. We find, however, that in all the specimens examined the lower valve of the sessile spikelet and the upper glume of the pedicelled one are truncate, not acute, and crested as shown in the drawing.

Found also in Abyssinia. Some species of the genus yield an aromatic oil, and a variety of the present species, *E. argenteus, var. thymiodora*, found in the Cape Colony, probably has this peculiarity.

Fig. 1, Plant about natural size ; 2, *sessile spikelet*, lower glume ; 3, upper glume ; 3a, same, back view ; 4, lower valve ; 5, upper valve ; 6, ovary, style, stigmas and lodicule ; 7, *pedicelled spikelet*, lower glume ; 8, upper glume ; 9, rhachis with sessile and pedicelled spikelets. *Except fig. 1, all enlarged.*

Elionurus argenteus, *Nees.*



Pollinia villosa. *Spreng*

PLATE 109.

Pollinia villosa (Spreng. Syst. I. 288, non Benth.)

Perennial.—Culms $1\frac{1}{2}$-3 feet long, rather stout, 3-4-noded, appressedly hirsute or pubescent at least below the nodes, and at the top. Sheaths usually exceeding the internodes except the uppermost, terete, tight, scantily hairy to villous or glabrescent, bearded at the nodes. Ligules membranous, $\frac{1}{2}$-1 line long, glabrous. Blades lanceolate-linear, gradually passing into the sheath, shortly acute, 4-7 inches long, 3-6 lines wide, flat, sub-erect, glabrous or more or less appressedly hairy.

Racemes (false spikes) 2-7, on a short common axis, sub-erect, stout, 2-6 inches long, joints and pedicels linear, stout, with long silvery grey hairs mainly along the margins and round the base, about $1\frac{1}{2}$-$2\frac{1}{2}$ lines long. Spikelets crowded, ferruginous, lanceolate, $2\frac{1}{2}$-$3\frac{1}{2}$ lines long. Glumes coriaceous, *lower* minutely truncate, dorsally depressed, margins broadly inflexed, keels long and densely ciliate; *upper* lanceolate, boat-shaped, shining, 3-nerved, keel ciliate above. Valves, *lower* empty, almost as long as the subtending glume, membranous below, hyaline above, 2-nerved, margins inflexed, ciliate; *upper* ovate-oblong, about $1\frac{1}{2}$ line long, acutely bifid to the middle, lobes ciliate. Awn 7-10 lines long, kneed above the middle. Pale small, oblong, obtuse, ciliate. Stamens 3. Anthers $1\frac{1}{2}$ line long. Lodicules 2, small, cuneate.

Habitat: Natal. Inanda, *Wood* 1591; Umpumulo, *Buchanan* 210; Mooi River, *Mason* 7; Zululand, *Swanfield;* and without precise locality, *Buchanan* 51. Also in Madagascar.

Figured from Swanfield's specimen, and compared with Buchanan's and Mason's.

This species was formerly known in Natal as *Eulalia villosa*, Nees, but is now included in the genus *Pollinia*.

Fig. 1, Plant about natural size; 2, rhachis with sessile and pedicelled spikelets; 3, lower glume, front view; 3a, same, back view; 4, upper glume, front view; 4a, same, side view; 5, lower valve; 6, upper valve; 7, ovary, style, stigmas, stamens, and lodicules; 8, pale. *Except fig. 1, all enlarged.*

PLATE 110.

URELYTRUM SQUARROSUM (Hack. Androp. in DC. Monogr. Phan. vi. 272).

Compactly tufted.—CULMS 2-2½ feet long, glabrous, few-noded. Sheaths exceeding the internodes except the uppermost, tight, terete, glabrous, smooth, the lower widened, very firm, shining, persistent. Ligules oblong, 2-3 lines long, glabrous or with a few long hairs behind. Blades very narrow, linear, tapering to a setaceous point, lowest up to 1 foot, by ¾-1¼ line, flat, convolute, rather rigid, glabrous, prominently nerved and finely scaberulous above.

RACEMES (false spikes) 5-6 inches long, 1½-2 lines thick, almost glabrous to villous. Joints obliquely truncate, 3-4 lines long, silky at the base, scantily pubescent to villous above, appendage up to 2 lines long, unequally lobed or toothed, ciliolate.

SPIKELETS heteromorphous, 2-nate (one sessile the other pedicelled) on the very fragile rhachis of solitary terminal, sub-cylindric spikelike racemes, the sessile deciduous, with contiguous joint of the rhachis and pedicel. *Sessile spikelets*, florets 2, lower male, upper perfect, about 4 lines long. Glumes, *lower* oblong to lanceolate, obtuse to acute, glabrous, smooth or punctate or pubescent to villous, keels 2, acute, at least above, distantly (sometimes obscurely) spinulously muricate at the middle, rigidly ciliate above, with 1-3 intracarinal nerves which are more or less prominent towards the tips; *upper* lanceolate, acute, firmly membranous, 3-nerved, side nerves sub-marginal, keel rigidly ciliate above, margins softly ciliate. Valves hyaline, sub-equal, slightly shorter than the glumes, softly ciliate, about 3 lines long; *lower* 2-nerved, lanceolate, acute; *upper* 3-sub-5-nerved, ovate, lanceolate, obtuse to sub-acute, mucronulate. Pales almost equalling their valves, hyaline, 2-nerved. Lodicules 2, cuneate. Stamens 3. Anthers 1½-2 lines long. Stigmas laterally exserted. *Pedicelled spikelets* varying in hairyness like the sessile, narrow and usually smaller than them, with 2 male florets or (often in the same raceme) more or less reduced, sometimes to an awn representing the lower glume, and a minute rudiment of the upper. Awn squarrose, flattened below, scabrid, 1½-3½ inches long.

Habitat: NATAL. Near Dundee, *W. E. Green* 2; 26.

Figured from Green's specimen, which is the only one in the Government Herbarium.

The lower floret of the sessile spikelet consists of the lower valve, rudimentary and minute ovary, with stamens and lodicules, and the pale of upper valve is thickened and fleshy below, and hyaline above, and the infolded margins are auricled at the base.

A very hard grass. (Mr. Celliers per Mr. W. E. Green).

Fig. 1, Plant about natural size; 2, joint of rhachis. *Sessile spikelet*, 3, lower glume, back view; 3a, same, front view; 4, upper glume, side view; 5, lower valve; 6, pale of same; 7, upper valve; 8, pale of same; 9, ovary, remains of filaments and lodicules. *Pedicelled spikelet*, 10, lower glume; 11, upper glume; 12, lower valve. *Except fig. 1, all enlarged.*

Urelytrum squarrosum. *Hack.*

Andropogon hirtiflorus, Kunth var semiberbis, *Stapf.*

Acc:-C970

Andropogon (Linn.)

The genus *Andropogon* includes many species, chiefly inhabiting tropical and sub-tropical regions. According to the Genera Plantarum, Vol. 3, there are "scarcely 100 species," while in the Flora Capensis, Vol. vii., page 334, it is stated that it consists of over "200 species in the warm parts of the world," but as the author, Dr. Stapf, says, "The genus as defined by Hackel consists of very heterogeneous elements, and I have no doubt that several of the old genera of which it is made up will have to be restored, as, for instance, *Chrysopogon*, *Cymbopogon* and *Heteropogon*," the difference between these two statements of numbers of the species is thus accounted for. The species of which the genus is at present composed differ very much in habit and utility, some being considered as excellent pasture and fodder grasses, others as *A. Sorghum*, being cultivated for their seeds, which are used as food; *A. saccharatus*, from whose culms syrup is made; *A. muricatus* and *A. Nardus*, from which species an essential oil is distilled, *A. muricatus* being the well-known "Khus-Khus" grass. Information as to the value of the Natal species is not readily obtainable, but such as I am able to get will be included under the descriptions of the different species.

PLATE 111.

Andropogon hirtiflorus (Kunth. Rév. Gram. ii. 569, t. 198) var. semiberbis (Stapf)

Perennial, tufted.—Culms 1-3 feet long, glabrous, more or less branched or almost simple. Sheaths tight, glabrous or hairy, particularly near the mouth. Ligules membranous, short, glabrous. Blades linear, acute, 2-12 inches long, 1-2 lines wide, folded, firm, smooth except the margins, glabrous or hairy near the base, glaucous or reddish, the uppermost very much reduced or suppressed. Peduncles never more than one from each sheath, the lateral generally exserted.

Racemes slender, stiff, 2-5 inches long, joints up to 20, 3-3$\frac{1}{2}$ lines long, with white silky hairs at the base, or more or less ciliate along the edges. Pedicels slightly shorter, ciliate along one or both edges. *Sessile spikelets* linear, 3$\frac{1}{2}$-4 lines long. Glumes, *lower* bicuspidate, coriaceous, sub-convex, smooth and often shining, keels scaberulous, intracarinal nerves 2-5; *upper* chartaceous, 3-nerved, margins ciliate, keel narrowly crested above. Valves, *lower* lanceolate, 2-nerved, ciliate; *upper* bifid beyond the middle, 1-nerved, lobes ciliate. Awn 5-8 lines long, lower twisted portion scarcely exserted. Pale very minute, or none. *Pedicelled spikelets* barren, 1$\frac{1}{2}$-2$\frac{1}{2}$ lines long, middle and carinal nerves strong, often with a fine awn from between the mucros. Valves hyaline, 3-1-nerved or suppressed.

Habitat: Natal. Umpumulo, *Buchanan* 199; Zululand, *Jenkinson* 41.

Drawn from Jenkinson's specimen, and compared with Buchanan's 199, but the pale in the perfect spikelet and valves in the barren one have not been found.

Fig. 1, Plant about natural size; 2, joint of rhachis; 3, sessile and pedicelled spikelets. *Sessile spikelet*—4, lower glume, back view; 4a, same, front view; 5, upper glume, side view; 6, lower valve; 7, upper valve; 8, stamen, pistil and lodicules. *Pedicelled spikelet*—9, lower glume, front view; 10, upper glume, side view. *Except fig. 1, all enlarged.*

PLATE 112.

ANDROPOGON CERESIÆFORMIS (Nees. Fl. Afr. Austr. 109).

A perennial tufted grass.—CULMS erect or ascending, very slender, 1-4 feet long, glabrous, smooth, many-noded, simple below, branched above, branches solitary or 2-4-nate, often sub-pendulous, filiform, with bearded tips; collected into a spathaceous raceme or panicle. Sheaths terete, tight, glabrous or hairy to villous, shorter than the internodes. Ligules very short, rounded. Blades linear, tapering to an acute point, 2-6 inches by 1-2 lines, flat, erect, somewhat firm, glabrous or hairy, turning red, midrib white. Spathes boat-shaped, acuminate, $\frac{3}{4}$-$1\frac{1}{4}$ inch long, membranous, reddish, glabrous, many-nerved.

RACEMES about 7-8 lines long, shortly peduncled, surrounded by the spathe, except the pedicelled spikelets. Joints 6-8, filiform, villous above, about $\frac{3}{4}$ line long. Pedicels similar, finer, villous all along.

SPIKELETS oblong, yellowish green or brown, hairy or glabrous and shining on the back, the sessile $1\frac{1}{2}$-2 lines long. Glumes, *lower* chartaceous, narrowly truncate, intracarinal nerves 2, evanescent below; *upper* membranous below, hairy above, 3-nerved, tips generally awned. Valves, *lower* lanceolate-oblong, faintly 2-nerved, margins softly ciliate; *upper* oblong-linear, bifid, almost $1\frac{1}{2}$ line long, 1-nerved, lobes very narrow, glabrous. Awn fine, about 5-7 lines long, kneed below the middle. Pale very minute. Anthers 1 line long. Grain oblong, dorsally slightly compressed. *Pedicelled spikelets* obtuse, about 2 lines long. Glumes, *lower* 7-9-nerved, nerves unequal; *upper* 5-nerved. Valves, *lower* 3-nerved, ciliate; *upper* very narrow, linear, nerveless, awnless. Pale none.

Habitat: NATAL. All over the colony, *Buchanan* 224, 225; Berea, *Wood* 5932; Drakensberg, *Wood* 5994; Dundee, *W. E. Green* 85; Zululand, *Jenkinson* 65.

Drawn from the specimens sent by Jenkinson, and compared also with Buchanan's and Wood's specimens.

From comparison of the different specimens we find that the indument of the spikelets and the nervation of the valves is very variable. In Jenkinson's specimen the villous hairs are almost absent, except on the rhachis. This grass is said to be eaten by cattle, but is of little value.

Fig. 1, Plant about natural size. *Sessile spikelet*—2, lowest glume; 3, upper glume; 4, lower valve; 5, upper valve; 6, stamens, stigma, ovary, and lodicules. *Pedicelled spikelet*, 7, lower glume; 8, upper glume; 9, lower valve, and rudimentary ovary. *Except fig. 1, all enlarged.*

Andropogon ceresiaeformis, *Nees.*

Andropogon [illegible] Vest

PLATE 113.

ANDROPOGON EUCOMUS (Nees. Fl. Afr. Austr. 104).

PERENNIAL, densely tufted.—CULMS slender, 1 to 3 feet long, glabrous, 4 to 6 or more noded, simple to or beyond the middle, then distantly branched. Branches long, very slender, solitary or 2-3-nate, simple or again branched.

LEAVES mainly basal. Sheaths shorter than the internodes, glabrous or hairy near the mouth, rarely lower down, the lower compressed, keeled, the upper distant, sub-tumid. Ligules membranous, very short, truncate, ciliolate. Blades linear, acute, folded, 3 inches to 1 foot by 1-1½ lines long (unfolded), glabrous or hairy, pale green. Spathe linear, setaceously acuminate, glabrous, 2 inches long, usually exceeding the filiform glabrous peduncle.

RACEMES 2-4-nate, 1-1½ inch long, very slender, flexuous, sub-erect or nodding, silvery plumose, joints filiform, shorter than the spikelets, silky with soft long (about 5 lines) hairs. Pedicels similar, exceeding the spikelets, barren.

SPIKELETS lanceolate, oblong, 1-1½ line long, often purplish. Glumes membranous, acute, *lower* nerveless between the scabrid keels. Callus minute, long bearded, *upper* 1-nerved. Valves, *lower* nerveless, ciliate; *upper* lanceolate-oblong, lobes very fine. Awn a fine bristle, 6-9 lines long. Pale very minute. Anthers ¼ line long. Grain over ½ line long.

Habitat: NATAL. Abundant on coast flats, *Buchanan* 211; Durban Flat, *Buchanan* 26, *Wood* 1654; Zululand, *Jenkinson* 16; Dundee, *Green* 32a; near Durban, *Wood* 6004.

Figured from Wood's 6004 and 1654, compared with Green's and Jenkinson's specimens.

Fig. 1, Plant about natural size; 2, rhachis with sessile, and rudimentary pedicel of upper spikelet; 3, lower glume; 4, upper glume; 5, lower valve; 6, upper valve: 7, pale; 8, ovary, style, stigmas, stamens and lodicules. *Except fig. 1, all enlarged.*

PLATE 114.

ANDROPOGON APPENDICULATUS (Nees. Fl. Afr. Austr. 105).

PERENNIAL, densely tufted.—CULMS erect, 2-3 feet long, glabrous, compressed or terete, 5-6-noded, simple below, remotely branched from the upper 2-3 nodes, branches solitary, long, straight, glabrous.

LEAVES mostly crowded near the base. Sheaths glabrous or bearded at the mouth, lower very firm, strongly compressed, keeled and persistent, upper shorter than the internodes, tight, uppermost sub-spathaceous. Ligules membranous, very short, truncate, ciliolate. Blades linear, acute, usually folded, lower 4-12 inches by 1-2½ lines (unfolded), uppermost very short or obsolete, rigid, glabrous, or hairy at the base, acutely keeled, margins scabrous.

PEDUNCLES generally long exserted, glabrous. Racemes 2-8, fascicled, unequal, 1½-4 inches long, flexuous, slender, loose; joints 2-3 lines long, thicker upwards, hairy on the convex back, or only along the margins, hairs white, particularly above, tips sub-cupular with irregularly toothed margins. Pedicels similar, more slender, produced into a subulate appendage facing the upper glume. *Sessile spikelets* lanceolate, 3-3½ lines long, often purplish. Glumes sub-coriaceous to chartaceous, glabrous; *lower* acute or acuminate, dorsally concave, keels acute, scabrid, or rigidly ciliate, callus scantily bearded; *upper* boat-shaped, 1-nerved. Valves, *lower* oblong-lanceolate, faintly 2-nerved, softly ciliate; *upper* 2 lines long, bifid to middle, 1-nerved, lobes very narrow, ciliate. Awn 5-7 lines long, kneed below the middle. Pale ½ line long, ciliate. Anthers 1 line long. *Pedicelled spikelets*, male, narrowly lanceolate, 3-3½ lines long, purplish, glabrous. Glumes, *lower* acuminate, with a median keel in the upper part; *upper* 1-nerved, resembling the entire lanceolate, muticous, reversedly ciliate valves.

Habitat: NATAL. Durban Flat, *Buchanan* 41; Riet Vlei, *Buchanan* 192; Umpumulo, *Buchanan* 191; Mooi River, *Mason* 29, 45; Zululand, *Jenkinson* 48; Dundee, *Green* 70, 76; near Durban, *Wood* 6049; Zululand, *Swanfield*.

Valuable as food—"Blaauw-Gras." (Mr. Celliers, per Mr. W. E. Green.)

Fig. 1, Plant about natural size. *Sessile spikelet*—2, lowest glume, back view; 2a, same, front view; 3, upper glume; 4, lowest valve; 5, upper valve; 6, pale; 7, stamens, style, stigmas, ovary, and lodicules. *Pedicelled spikelet*—8, lowest glume; 9, upper glume; 10, rhachis of spikelet. *Except fig. 1, all enlarged.*

Andropogon appendiculatus. *Nees.*

Andropogon schirensis, Hochst. var angustifolia. Stapf

PLATE 115.

ANDROPOGON SCHIRENSIS (Hochst. ex Rich. Tent. Fl. Abyss. ii. 456)
var. angustifolia (Stapf).

PERENNIAL, tufted.—CULMS erect, slender, 2-3 feet long, glabrous, 3-4-noded, simple, rarely with an additional flowering branch from one of the uppermost nodes.

LEAVES mainly crowded near the base. Sheaths terete, tight, glabrous, lowest more or less persistent. Ligules membranous, very short, truncate. Blades narrow, linear, tapering to a fine, sometimes setaceous point, 4-7 inches by 1 rarely 2 lines, rather firm, glabrous, rarely hairy below, margins scabrid.

RACEMES 2-nate, rarely solitary, rather slender, 2-3½ inches long, strict or subflexuous. Joints and pedicels very similar, cuneate-linear, 2-3 lines long, tips deeply hollowed and produced into a short irregularly toothed appendage, long ciliate along the margins. *Sessile spikelets* strongly laterally compressed, wedged in between the pedicel and the joint, 2½-3 lines long; callus slender, pungent, densely bearded, 1 line long, sunk in the hollow of the preceding joint. Glumes subcoriaceous or chartaceous, glabrous, smooth; *lower* linear, subacute, keels narrow, with a deep narrow groove (fold) between them, scaberulous above; *upper* boat-shaped, finely mucronate, 1-nerved. Valves, *lower* oblong-linear, obtuse, 2-nerved, ciliate; *upper* deeply bifid, 1-nerved, lobes lanceolate, acute, ciliolate. Awn ¾-1¼ inch long, slender, kneed and pubescent below the middle. Pale oblong, 1½ line long, nerveless or sub-2-nerved. Anthers 1 line long. *Pedicelled spikelets* male, dorsally compressed, 4-5 lines long, often reddish or purple. Glumes subherbaceous, acuminate, glabrous; *lower* acutely 2-keeled, keels scabrid or rigidly ciliate above, intracarinal nerves 8; *upper* linear-lanceolate, 3-nerved, ciliate. Valves, *lower* as in the sessile spikelets: *upper* linear, shortly 2-toothed, muticous. Pale linear, 1-1½ line long.

Habitat: NATAL. Umpumulo, *Buchanan* 195; Riet Vlei, *Buchanan* 193, 196; and without precise locality, *Buchanan* 116, partly: near Dundee, *Green*, 92.

Figured from Green's specimen.

Fig. 1, Plant reduced. *Pedicelled spikelet*—2, lower glume, front view; 3, same, back view; 4, upper glume, front view; 5, upper valve, front view; 6, pale; 7, stamens and lodicules. *Sessile spikelet*—8, upper valve; 9, lower glume, back view; 10, same, front view; 11, upper glume, side view; 12, lower valve, front view; 13, stamens, ovary, stigmas, and lodicules; 14, pale; 15, portion of rhachis. *Except fig. 1, all enlarged.*

PLATE 116.

ANDROPOGON AMPLECTENS (Nees. Fl. Afr. Austr. 104).

PERENNIAL, densely tufted.—CULMS erect, slender, 2-2½ feet long, glabrous, 3-5-noded, simple or with 1-3 flowering branches from the upper nodes.

LEAVES mostly crowded at the base. Sheaths terete, tight, glabrous, lowest widened, sub-persistent ; ligules membranous, short, truncate or rounded. Blades linear, tapering to a long setaceous point, broad, rounded at the base, or subcordate and subamplexicaul, 4-8 inches long, 3-5 lines wide, flat or convolute above, rather firm, glabrous, margins scabrid.

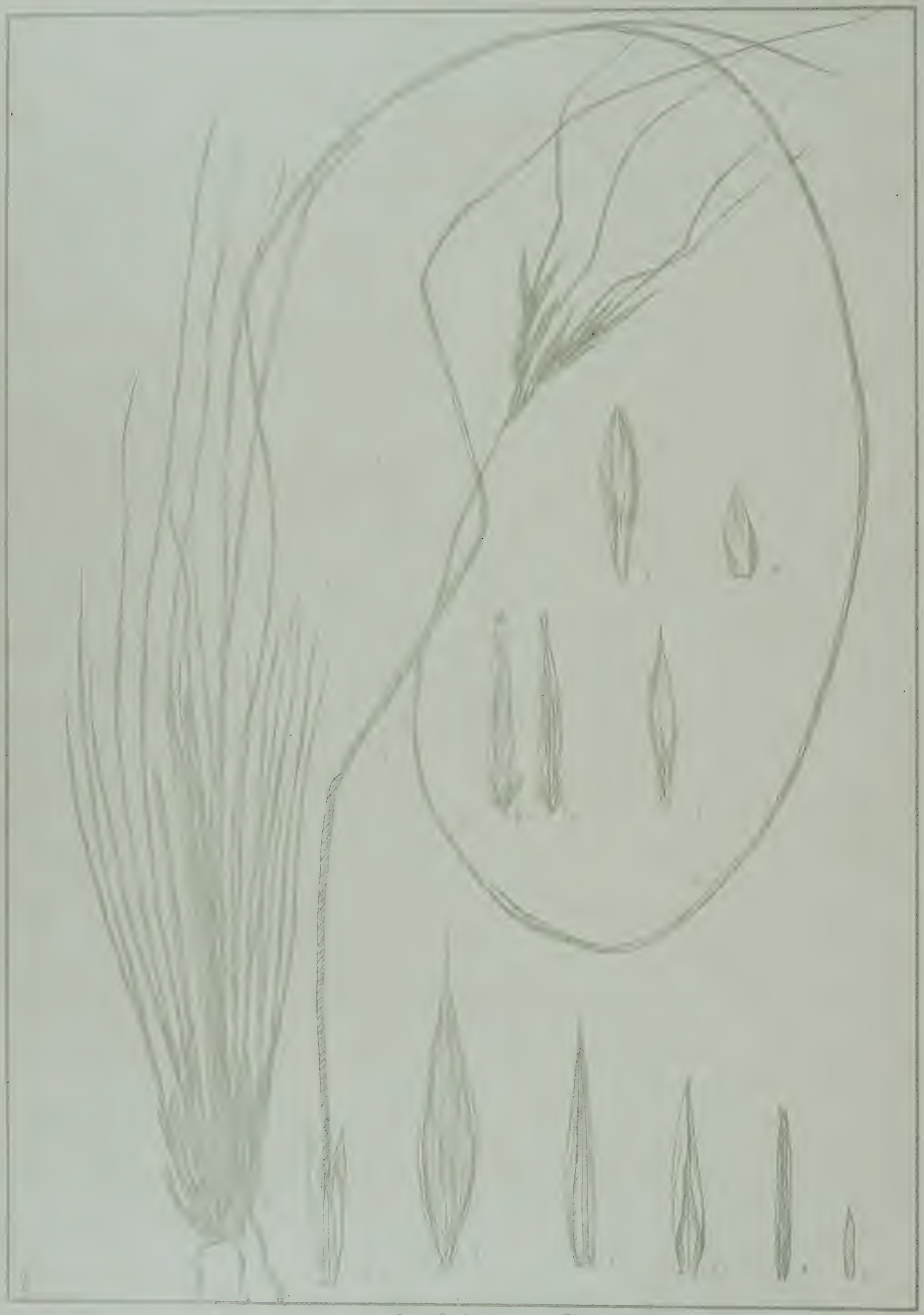
RACEMES 2-nate, rather slender, 2-3½ inches long, strict or subflexuous ; joints and pedicels very similar, sublinear, 3 lines long, shortly ciliate along the margins, tips hollowed, denticulate. *Sessile spikelets* laterally compressed, wedged in between the pedicel and the joint, 3½-4 lines long, glabrous, callus short, acute, bearded, sunk in the hollows of the preceding joint. Glumes coriaceous, *lower* linear-lanceolate, acuminate, 2-toothed, keels rounded and broad below, acute and scabrid near the tips, with a distinct groove (fold) extending between them to the acumen, and with 2 fine lateral furrows in the upper third ; *upper* 1-nerved, mucronate or aristulate. Valves subequal ; *lower* lanceolate, 3-nerved, softly ciliate ; *upper* linear-lanceolate, deeply bifid, lobes lanceolate, ciliolate. Awn stout, 1¼-2 inches long, kneed and pubescent below the middle. Pale linear-oblong, 1 line long, nerveless, ciliate. Anthers 2½ lines long. *Pedicelled spikelets* male, dorsally compressed or subterete, lanceolate, 5-6 lines long. Glumes subherbaceous, acuminate, often aristulate ; *lower* acutely 2-keeled, keels scabrid or rigidly ciliate above, intracarinal nerves many (to 19), middle nerve stronger ; *upper* linear-lanceolate, 3-sub-5-nerved, ciliate. Valves linear, 3-nerved ; *lower* acuminate, 4½ lines long, ciliate ; *upper* 3½ lines long, 2-toothed, muticous. Pale linear, 2 lines long, nerveless.

Habitat : NATAL. Umpumulo, *Buchanan* 194 ; *Gerrard* 769 ; *Buchanan* 116, partly ; near Maritzburg, *St. George* 33.

Fig. 1, Plant about natural size ; 2, joint of rhachis. *Pedicelled spikelet*—3, lower glume, front view ; 4, upper glume, front view ; 5, upper valve, front view ; 6, pale. *Sessile spikelet*- 7, lower glume, back view ; 8, upper glume, side view ; 9, lower valve, front view ; 10, upper valve, front view ; 11, stamens, stigmas and lodicules ; 12, pale. *Except fig. 1, all enlarged.*

NOTE.—The upper valve of pedicelled spikelet is 2-toothed, not mucronate as shown in the drawing.

Andropogon amplectens Nees



Andropogon filifolius. *Steud.*

PLATE 117.

ANDROPOGON FILIFOLIUS (Steud. Syn. Pl. Glum. i. 374).

PERENNIAL, densely tufted.—CULMS erect, slender, 1-2½ feet long, glabrous, terete, about 3-noded, simple.

LEAVES mainly crowded at the base. Sheaths shorter than the internodes, terete, tight, glabrous, lowest persistent, at length breaking up into fibres; ligules membranous, very short, truncate. Blades very narrow, convolute, filiform, acute, lowest ⅔-1 foot long, upper very short, firm, flexuous, glabrous or hairy at the base.

RACEMES 2-nate, 2½-3½ inches long, stout, strict; joints and pedicels subequal and similar, cuneate-linear, 2½-3½ lines long, densely and shortly villous along the margins, tips hollowed, unequally toothed. *Sessile spikelets* laterally compressed, wedged in between joint and pedicel, 3½ lines long, callus slender, 1-1½ line long, acute, densely bearded. Glumes subcoriaceous, glabrous, smooth; *lower* linear, obtuse, tips hyaline, keels narrow, rounded, smooth, almost contiguous, with a deep very narrow groove (fold) between them; *upper* boat-shaped, 1-sub-3-nerved, ciliate. Valves subequal; *lower* oblong-linear, 2-nerved, ciliate; *upper* linear deeply bifid, 3-nerved, lobes oblong, ciliolate. Awn stout, 2-2¼ inches long, kneed at the middle, pubescent below. Pale ovate, acute, 1½ line long, nerveless, glabrous. Anthers 2¼ lines long. *Pedicelled spikelets* male, dorsally compressed or subterete, lanceolate, 6-8 lines long, glabrous, often purplish. Glumes, *lower* herbaceous, 2-toothed, one tooth often prolonged into a bristle (to 3 lines long), acutely 2-keeled, intracarinal nerves many (to 20); *upper* finely acuminate, 3-nerved, ciliate. Valves, *lower* linear-oblong, acute, 4 lines long, 3-2-nerved, ciliate; *upper* linear, 1-nerved glabrous, muticous. Pale linear, 2 lines long, nerveless. Anthers 3½ lines long.

Habitat: NATAL. Riet Vlei, *Buchanan* 197; near Newcastle, *Buchanan* 195.

Figured from Buchanan's 197, which is the only specimen in the Natal Government Herbarium. Buchanan's 195 is also in the Herbarium, but the portion of it that we have proves to be wholly *A. schirensis.* Stamens and pistil were not found in the specimen from which the artist drew the figure, and could not therefore be shown in the drawing, and this species has not been sent by any contributor.

This plant has been gathered in Cape Colony and Transvaal, but apparently is not very common in Natal.

Fig. 1, Plant about natural size. *Pedicelled spikelet*—2, lower glume; 3, upper glume; 4, lower valve; 5, upper valve; 6, pale. *Sessile spikelet*—7, lower glume, back view; 7a, same, front view; 8, upper glume; 9, lower valve; 10, upper valve; 11, pale. *Except fig. 1, all enlarged.*

PLATE 118.

ANDROPOGON INTERMEDIUS (R. Br. Prodr. 202), var. punctatus (Hack. Andr. in DC. Monogr. Phan. vi. 487).

PERENNIAL.—CULMS erect or ascending, usually simple, to 5 feet long, rather stout.

SHEATHS glabrous except the sometimes appressedly hairy nodes, terete, tight, longer than the internodes, or the upper shorter: ligules very short, truncate, often with hairs from behind. Blades linear, tapering to a long fine point, 4-30 inches long by $1\frac{1}{2}$-4 lines wide, rather rigid, glabrous or sometimes hispid at the base, usually smooth except the margins.

PANICLE compound, oblong, dense, 4-7 inches long, usually purplish, common rhachis, 2-5 inches long, branches like the short peduncles glabrous, except for the bearded axils. Racemes slender, often flexuous, joints and pedicels about half the length of the spikelets or slightly longer, ciliate, cilia usually shorter than the joint. *Sessile spikelets* linear-oblong, $1\frac{1}{2}$-$1\frac{3}{4}$ line long, purplish, callus minutely bearded. Glumes, *lower* rather thin, slightly truncate, pitted, glabrous or more or less hairy below the middle, intracarinal nerves faint, 4-7, keels spinulously ciliate above, rarely smooth; *upper* acute or sub-acute, 3-nerved, scantily ciliate or glabrous. Valves, *lower* oblong, sub-obtuse, nerveless, glabrous; *upper* almost reduced to a very slender kneed awn, 5-7 lines long. Pedicelled spikelets male or barren, usually not pitted, sometimes reduced to the glumes.

Habitat: NATAL. Banks of Umlaas River, *Drège*; Umpumulo, *Buchanan* 295; without precise locality, *Gueinzius*; Umhlanga, *Wood* 6061.

Figured from Wood's specimen.

Wood's No. 6061 was sent to Professor Hackel, who named it *A. punctatus*, Roxb., but the Flora Capensis quotes the plant as a variety of *A. intermedius*, R. Br., which is a native also of Tropical Asia and Australia.

Fig. 1, Plant natural size; 2, rhachis with sessile and pedicelled spikelets. *Sessile spikelet*—3, lower glume, back view; 3a, same, front view; 4, upper glume; 5, lower valve; 6, upper valve; 7, stamens, pistil and lodicules. *Pedicelled spikelet*—8, lower glume; 9, upper glume. *Except fig. 1, all enlarged.*

Andropogon intermedius, R. Br. var punctatus. *Hack.*

Androp. gon. helep. nsis Brot. var. effusus, *Stapf.*

PLATE 119.

ANDROPOGON HALEPENSIS (Brot. Fl. Lusit. i. 89), var. effusus (Stapf in Hook. f. Fl. Brit. Ind. vii. 183).

PERENNIAL, stoloniferous ?—CULMS erect, usually very tall, up to 10-16 feet long, stout, simple or scantily branched. Sheaths glabrous, except the minutely silky nodes, strongly striate; ligules membranous, short, ciliate, hairy inside. Blades linear-lanceolate, or linear from an often rounded base, long tapering to a fine point, 1-2 feet long, $\frac{3}{4}$-$2\frac{1}{2}$ inches broad, flat, glabrous, or with a silky line on the back at the union with the sheath, margins serrulate, midrib stout.

PANICLE decompound, very large, up to $1\frac{1}{2}$ foot long, effuse, nodding, lower branches up to 1 foot long, often undivided to the middle. Rhachis and branches or at least the ultimate branchlets scabrid and minutely bearded at the nodes. Racemes $\frac{1}{2}$-2 inch long, linear; joints 3-7, more than half as long as the sessile spikelets, more or less ciliate; pedicels very similar. *Sessile spikelets* ovate-lanceolate, 3-$4\frac{1}{2}$ lines long, 1-$1\frac{1}{2}$ line broad, pale, ultimately sometimes darker or even black, shining. Glumes, *lower* more or less hairy, at least on the sides, 7-13-nerved, callus shortly bearded; *upper* lanceolate, acuminate, shining, 5-7-nerved. Valves, *upper* broadly oblong or ovate, 2-lobed, half as long as the glumes, ciliate, 1-nerved. Awn 4-6 lines long, rarely longer, kneed, sometimes reduced to a bristle, or suppressed. Pale linear-oblong, slightly shorter than the valve. Anthers $1\frac{1}{4}$-$1\frac{1}{2}$ line long. Grain obovate or obovate-oblong, $\frac{1}{3}$ shorter than the glumes. *Pedicelled spikelets* almost as long as the sessile but narrower, male or barren. Glumes, *lower* herbaceous, glabrous, 5-9-nerved, kee'ls aculeolate or scabrid; *upper* similar, 3-5-nerved. Valves, when present hyaline, ciliate, 2-1-nerved.

Habitat: NATAL. Near Durban, *Drège*; banks of Tugela River, *Buchanan* 296; Umlaas River, *Krauss* 184; Umhlanga, *Wood* 1332, 6064; without precise locality, *Gerrard* 690; Zululand, *Jenkinson* 51.

Figured from Wood's 6064, and compared with Jenkinson's specimen.

Baron F. v. Mueller says of this grass: "Attains a height of 5-6 feet. Not easily repressed in moist ground. A rich perennial grass, often cultivated under the name of 'Cuba grass' and 'Johnson grass.' * * * It keeps green in the heat of summer and is also a winter grass in frost-free localities, is not eaten out by pasture animals; it will also grow in drift sand of the coast, and will keep growing in the dry season, when most other grasses fail, but improves much on irrigation; the roots resist some frost; three tons can be cut from an acre in a single season. It yields so large a hay crop that it may be cut half a dozen times in a season should the land be rich. All kinds of stock have a predilection for this grass. Much overlooked in its importance for fixing loose soil on embankments. It will mat the soil with its deep and spreading roots, hence it should be kept from cultivated fields. Detrimental to Lucerne in meadows." Our p'ant is a variety of the grass of which Baron v. Mueller writes.

Fig. 1, Plant about natural size; 2, rhachis and spikelets. *Pedicelled spikelet*—3, lower glume; 4, upper glume; 5, upper valve; 6, lower valve; 7, pale and lodicules. *Sessile spikelet*—8, stamens and pistil. *Except fig. 1, all enlarged.*

PLATE 120.

ANDROPOGON SORGHUM (Brot. Fl. Lusit. i. 88).

ANNUAL.—LEAVES as in *A. halepensis*, but the ligule often glabrous or glabrescent.

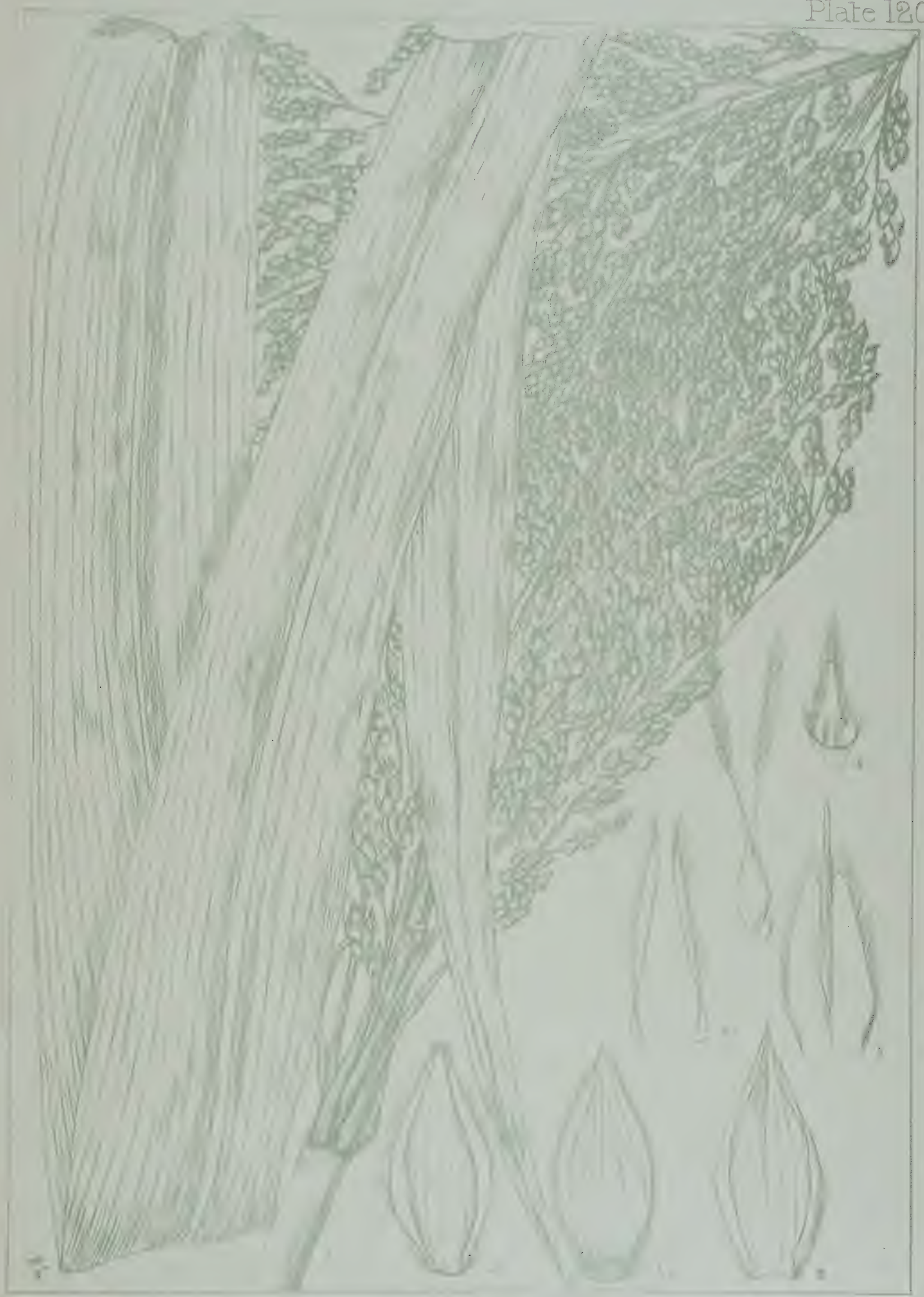
PANICLE very variable, from effuse to compact. Rhachis of racemes tough, joints and pedicels half as long as the sessile spikelets, or very often much shorter, more or less ciliate. *Sessile spikelets* very variable in shape and size, on the whole broader than in *A. halepensis*, 2-3½ by 1¼-2½ lines, pale, reddish, brown or at length black, usually shining. Glumes, *lower* coriaceous, or more or less herbaceous, particularly towards the tips, rarely quite thin, except at the base, often prominently nerved in the herbaceous part, hairy, rarely quite glabrous, otherwise as in *A. halepensis*. Awn 2½-7½ lines long, more or less reduced or 0. Grain obovate to globose. *Pedicelled spikelets* male, or more frequently barren, and more or less reduced.

Habitat: NATAL. Lower Umvoti, *Wood* No. 3990.

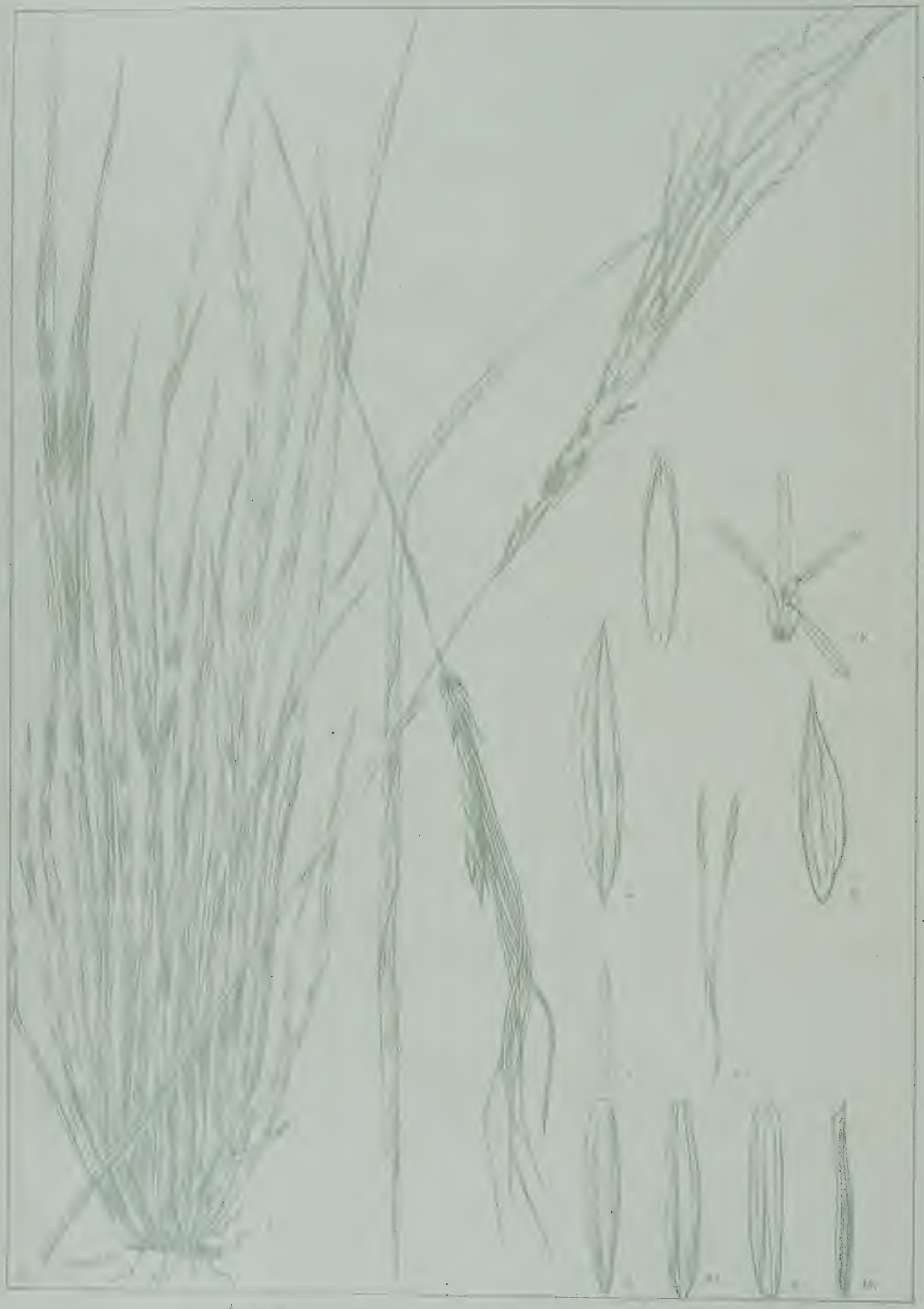
Figured from Wood's specimen.

This is the Kafir Corn or "Amabele" of the natives, and the specimen from which the drawing was made is probably an escape from native cultivation. There are some 7 varieties of the plant in tropical and South Africa, and it is stated in Flora Capensis, Vol. vii., Part 2, page 348, that this specimen most likely belongs to the variety *usorum*, but more ample material is required to distinguish clearly between the different varieties. The one here figured is the only specimen in the Government Herbarium. It is, I think, generally believed that this plant is the cultivated form of *A. halepense*, and its varieties and synonyms are very numerous. Professor Hackel enumerates in the Flora of British India 7, while Dr. Stapf, in the same work arranges them in 9 varieties (including many of the African ones). Good sets of the different varieties cultivated by the natives in Natal are very desirable.

Fig. 1, Leaf and inflorescence, natural size. *Sessile spikelet*—2, lower glume, front view; 2a, same, back view; 3, upper glume; 4, lower valve; 5, upper valve; 6, pale and lodicules; 7, ovary and stigmas. *Except fig. 1, all enlarged.*



Andropogon Sorghum, Brot. var. nervosum, Sm.



Andropogon contortus. *Linn.*

PLATE 121.

ANDROPOGON CONTORTUS (Linn. Spec. Plant. 1045).

PERENNIAL.—CULMS erect, stout, simple or branched from the upper nodes, often sheathed all along, 1-3 feet long. Sheaths compressed, keeled, glabrous; ligules short, truncate, ciliolate. Blades linear, acute or tapering to a long fine point, 3-8 inches long, by 1½-3 lines wide, flat or channelled, rigid, scabrid, especially above, sparingly hairy at the base or all over.

RACEMES 1½-3 inches long, straight or curved, rhachis tough between the lowest 2-6 pairs, the spikelets of which are male and like the pedicelled of the upper pairs, joints very short, unequally bearded. *Sessile spikelets* of the heteromorphous pairs, female, 3-3½ lines long, callus 1½ line long, rufous bearded. Glumes, *lower* linear-oblong, truncate, shortly hairy, obscurely nerved; *upper* membranous, 3-nerved. Awn stout, 3½-7 inches long, rufous hairy below. *Male spikelets* obliquely lanceolate, 4-5 lines long, dull green. Glumes, *lower* herbaceous, sub-obtuse, glabrous or hirsute with tubercle based hairs, many nerved, keels unequally winged; *upper* 3-nerved. Valves, *lower* minute; *upper* suppressed. Anthers 1½ line long.

Habitat: NATAL. Umsinga and base of Biggarsberg, *Buchanan* 91; near Maritzburg, December, *St. George* 3 (*Wood* 7244).

Figured from St. George's specimen.

In the Flora Capensis, Vol. vii., p. 351, a plant collected by Buchanan in O. F. State, and numbered 233, is said to be this plant, but Buchanan's 233 in the Government Herbarium, is a *Brachypodium.* In the specimen examined we find in the pedicelled spikelets of the heteromorphous pairs, and in both spikelets of the homogamous pairs, that the upper valve is hyaline and 1-nerved, and the pale equals the lodicules in size. The glumes of the pedicelled spikelets of both pairs, and of the sessile spikelets of the homogamous pairs, are quite glabrous.

Fig. 1, Plant about natural size. *Sessile spikelet*—2, lower glume, back view; 2a, same, front view; 3, upper glume, front view; 3a, same, side view; 4, lower valve; 5, upper valve; 6, ovary and stigmas. *Pedicelled spikelet*—7, lower glume, front view; 8, upper glume, front view; 9, lower valve; 10, upper valve with lodicules, pale and stamens. *Except fig. 1, all enlarged.*

PLATE 122.

ANDROPOGON NARDUS (Linn. Sp. Plant. 1046), var. validus (Stapf. Fl. Cap. vii. 352).

PERENNIAL, densely tufted, innovation shoots intravaginal.

CULMS slender, erect, 4-7 feet long, glabrous, smooth, stout, simple and 4-5-noded below the spurious panicle, longest internodes often 1 foot long, or longer.

LEAVES mainly crowded near the base. Sheaths tight, glabrous, except the lowermost, which are fugaciously hairy to tomentose at the very base, and 9-12 inches long, very firm and persistent, the upper 1-2, much shorter than the internodes; ligules very firm, rounded, up to 2-3 lines long. Blades narrow, linear, very long, tapering to a fine point, 2 feet long, by $2\frac{1}{2}$-$4\frac{1}{2}$ lines wide, flat, rigid, glabrous, margins scabrid.

PANICLES more or less compound, spathaceous, usually narrow, 6-12 inches long, with a distant flowering branch below it. Racemes $\frac{1}{2}$-$\frac{3}{4}$ inch long, finally deflexed or horizontally spreading, subtended by lanceolate, boat-shaped, many nerved, scarious, often reddish spathes 7-9 lines long, on slender common peduncles, which are 4-8 inches long; joints and pedicels linear, slender, about 1 line long, densely hairy along the margins, tips cupular, irregularly toothed. Spikelets of the lowest pair of the sessile raceme male, like the pedicelled ones; the sessile of all the other pairs perfect. *Perfect spikelets* lanceolate, $2\frac{1}{4}$-$2\frac{1}{2}$ lines long, reddish above. Glumes, *lower* sub-chartaceous, minutely 2-toothed or subacute, dorsally flattened, or slightly depressed, glabrous, keels widened above into narrow or broad, often serrulate, scarious wings, intracarinal nerves 2-4, unequal, evanescent below; callus short, minutely bearded; *upper* lanceolate, acute or mucronate, 1-nerved, glabrous, keel narrowly winged. Valves hyaline, *lower* lanceolate-linear, $1\frac{1}{2}$-2 lines long, ciliate; *upper* linear, very narrow, bifid, $1\frac{1}{4}$-$1\frac{3}{4}$ line long, 1-nerved, lobes fine, ciliate. Awn slender, 6-7 lines long, kneed at or below the middle, glabrous below. Pale 0. Anthers 1 line long. Grain $1\frac{1}{4}$ line long. *Pedicelled spikelet* male, lanceolate acute, $2\frac{1}{2}$ lines long. Glumes, *lower* many nerved: *upper* 3-nerved, keels of both scabrid. Valves, *lower* linear, obtuse, nerveless or 2-nerved at the base, $1\frac{1}{4}$ line long; *upper* 0. Pale 0.

Habitat: NATAL. Near Durban, *Williamson* 52; *Krauss* 87; Inanda, *Wood* 1622; near Maritzburg, *Rehmann* 7600; Dundee, *Green* 72.

A. Nardus is a very variable species; the type is Indian, and has not been found in South Africa, but we have 3 varieties viz., *marginatus* (Hack.), *prolixus* (Stapf), and *validus* (Stapf). We find that these varieties run very closely together, so that it is often difficult to distinguish between them. Specimens from Mr. Green, 114 and 87, and Mr. Swanfield's without number, are probably near to the variety *marginatus*. The Flora of British India describes 9 varieties, none of which appear to be identical with the African ones.

Fig. 1, Culm, upper portion, leaves and inflorescence, about natural size; 2, spathe and 2-nate racemes; 3, joint and pedicel. *Sessile perfect spikelet*—4, lower glume; 5, upper glume, 6, lower valve; 7, upper valve; 8, stamens, pistil and lodicules. *Pedicelled spikelet*—9, lower glume; 10, upper glume; 11, lower valve. *Except fig. 1, all enlarged.*

Andropogon nervatus, Lam. var. setifolia, Nees

PLATE 123.

ANDROPOGON PLURINODIS (Stapf. Fl. Cap. vii. 353).

PERENNIAL, compactly tufted ; innovation shoots intravaginal.

CULMS slender, erect, 1-3 feet long, glabrous, smooth, simple below, 4-6 (rarely 3) noded, longest internode 6-10 inches long, rarely longer. Sheaths tight, shorter than the internodes except the lowermost, which are fugaciously hairy to tomentose at the very base, $1\frac{1}{2}$-3 inches long, firm and persistent, the upper usually much shorter ; ligules firm, very short, up to 1 line long, rounded. Blades very narrow, linear, filiform or setaceous in the upper part, 4-8 inches long, by 1-$1\frac{1}{2}$ line broad, flat or partly folded, rather rigid below, flexuous above, glabrous, glaucous, margins scabrid.

PANICLES narrow, rather lax, usually scantily branched, 3-6 inches long. Racemes $\frac{2}{3}$-1 inch long at length horizontally spreading or deflexed on slender peduncles, which are 3-5 lines long and subtended by lanceolate, acuminate, many nerved, scarious, reddish spathes, $\frac{3}{4}$-$1\frac{1}{4}$ inch long ; joints and pedicels linear, slender, 1-$1\frac{1}{2}$ line long, densely hairy along the margins, tips cupular, irregularly toothed.

SPIKELETS of the lowest pair of the sessile raceme alike, male, of the sessile of all the other pairs perfect, the pedicelled male. *Perfect spikelets* very narrow, lanceolate, acute, 3 lines long. Glumes, *lower* chartaceous, acute, or 2-toothed, more or less concave between the keels which are rounded and smooth near the base, obscurely winged and scabrid towards the reddish or purplish tips, intracarinal nerves 2-5, the middle one or all evanescent below ; *upper* sub-chartaceous, lanceolate, acute, 1-nerved, glabrous (ciliate in our specimen). Valves hyaline ; *lower* linear, 2-$2\frac{1}{2}$ lines long, ciliate ; *upper* slightly shorter, linear-oblong to linear, deeply bifid, lobes lanceolate to subulate. Awn slender, 5-8 lines long, kneed at or below the middle. Pale 0. Anthers $1\frac{1}{2}$ line long. *Pedicelled spikelets* dorsally compressed, lanceolate, acuminate, 3-$3\frac{1}{4}$ lines long, purplish. Glumes, *lower* many nerved, keels scabrid ; *upper* 3-5-nerved, with or without a median keel. Valves, *lower* linear-lanceolate, $2\frac{1}{2}$ lines long, 2-nerved, ciliate ; *upper* 0. Pale 0.

Habitat : NATAL. On Tugela River near Colenso, *Rehmann* 7158 ; Biggarsberg, *Rehmann* 7112 ; Mooi River, April, *Wood* 4318.

Figured from Wood's 4318.

This plant was formerly known as, or confused with *A. marginatus*, but has been separated as above, by Dr. Stapf, in Flora Capensis.

Fig. 1, Plant about natural size. *Sessile perfect spikelets*—2, lower glume, back view ; 2a, same, front view ; 3, upper glume ; 4, lower valve ; 5, upper valve ; 6, pistil, stamens and lodicules. *Pedicelled spikelet*—7, lower glume, front view ; 8, upper glume ; 9, lower valve ; 10, spathe with 2-nate racemes. *Except fig. 1, all enlarged.*

PLATE 124.

ANDROPOGON SCHŒNANTHUS (Linn. Sp. Plant. 1046), var. versicolor (Hack. Andr. in DC. Monogr. Phan. vi. 610).

PERENNIAL, frequently with extravaginal innovation shoots, besides some intravaginal ones, or annual (or at least flowering the first year).

CULMS fascicled, erect or shortly ascending, stout or rather so, 2-4 feet long, simple and 4-7-noded below the spurious panicle. Sheaths tight, quite glabrous, subherbaceous. or the lowermost firmer, and sometimes subpersistent, 2-3 inches long; upper shorter than the internodes; ligules very short, rounded. Blades linear to linear-lanceolate from a broader rounded or subcordate base, tapering to a long setaceous point, $\frac{1}{2}$-1 foot long, by 3-6 lines wide (in the South African specimens), flat, rather flaccid, dull green or sub-glaucous, glabrous, smooth or the margins scabrid.

PANICLES more or less compound, narrow, often interrupted, 4-6 inches long, rarely longer. Racemes 4-9 lines long, 2-nate, at length reflexed or horizontally spreading, on slender peduncles which are 2-4 inches long, and subtended by lanceolate boat-shaped, many-nerved scarious reddish spathes, $\frac{1}{2}$-1 inch long; joints and pedicels linear, slender, or the lowest somewhat stout, 1-1$\frac{1}{4}$ line long, densely hairy, mainly along the margins, tips minutely cupular, toothed. *Spikelets* of the lowest pair of the sessile raceme alike, male, the sessile of all the other pairs perfect, the pedicelled male. *Perfect spikelets* lanceolate, 2-2$\frac{1}{4}$ lines long, often variegated. Glumes, *lower* subacute or obscurely 2-toothed, dorsally flattened, with a narrow groove from the middle downward, corresponding to a keel on the inner side, keels narrowly or obscurely winged and scabrid above, evanescent below; *upper* lanceolate, acute, 1-sub-3-nerved. Valves hyaline, *lower* oblong, 1$\frac{3}{4}$ line long, 2-nerved, ciliate; *upper* scarcely shorter, very narrow, linear, deeply bifid, lobes very fine. Awn 5-7 lines long, slender, bent just below the middle, glabrous below the bend. Pale 0. Anthers 1 line long. *Pedicelled spikelets* oblong subacute, 2 lines long. Glumes, *lower* 9-11-nerved; *upper* 3-nerved. Valves *lower* oblong, almost equalling the glumes, 2-nerved; *upper* and pale 0. Anthers 1$\frac{1}{2}$ line long.

Habitat: NATAL. Drakensberg Range, *Krauss* 26; Umpumulo, *Buchanan* 231; near Durban, May, *Wood*, 6046; near Durban, February, *Wood* 7577.

Figured from Wood's 7577.

Fig. 1, Plant about natural size; 2, spathe with 2-nate racemes; 3, lower pair of spikelets of sessile raceme. *Sessile spikelet*—4, lower glume, back view; 5, upper glume; 6, lower valve; 7, upper valve; 8, stamens, stigmas, and lodicules. *Pedicelled spikelet*—9, lower glume; 10, upper glume; 11, lower valve. *Except fig. 1, all enlarged.*

Andropogon Schoenanthus, Linn. var versicolor, *Hack.*

PLATE 125.

ANDROPOGON HIRTUS (Linn. Sp. Plant. 1046).

PERENNIAL, tufted; innovation shoots mostly intravaginal.

CULMS erect, rather slender, 1-3 feet long, glabrous, simple or more or less branched and 3-6-noded below the panicle, longest internode generally less than $\frac{1}{2}$ foot long. Sheaths tight, glabrous, the lowest crowded, compressed, firm, persistent, the upper terete, shorter than the internodes; ligules oblong, obtuse, up to $1\frac{1}{2}$ line long. Blades narrow, linear, tapering to a long fine point, 4 inches to more than 1 foot long, by $\frac{3}{4}$-$1\frac{1}{2}$ line wide, glabrous, finely scaberulous, more or less glaucous, turning reddish, midrib white.

PANICLE spathaceous, lax, contracted, sometimes reduced to a few simple branches; 6 inches to more than 1 foot long. Racemes $\frac{3}{4}$-$1\frac{1}{2}$ inch long, silvery villous, on very slender, usually nodding, pubescent or villous, rarely glabrous peduncles, which are 1-3 lines long, and more or less exserted from the long, very narrow, finely acuminate, glabrous or scantily hairy, reddish spathes; joints filiform, obliquely truncate, up to 2 lines long, densely ciliate. Pedicels very similar, often produced (in the South African species) into a linear or subulate appendage facing the upper glume. Spikelets of the lowest pair of the sessile raceme alike, male, the sessile of all the other pairs perfect, the pedicelled male. *Perfect spikelets* linear-oblong, 2-3 lines long, pale or purplish. Glumes, *lower* chartaceous, minutely truncate, dorsally flattened, villous, keels obscure except close to the membranous reddish tips, intracarinal nerves about 5, evanescent below; *upper* lanceolate-oblong, obtuse, mucronate, 3-nerved, margins ciliate, keel hirsute above. Valves, *lower* hyaline, linear-oblong, obtuse, faintly 2-nerved, softly ciliate: *upper* very narrow, linear, bifid, about $1\frac{1}{2}$ line long, ciliate, base, margins and lobes hyaline. Awn stout, pubescent, 1-$1\frac{1}{2}$ inch long, kneed below the middle. Pale very minute or 0. Anthers $\frac{3}{4}$-1 line long. *Pedicelled spikelets* lanceolate, $2\frac{1}{2}$-3 lines long. Glumes, *lower* herbaceous, 7-11-nerved, mucronate or shortly awned: *upper* lanceolate-oblong, acute, 3-nerved, softly ciliate. Valves, *lower* as in the perfect spikelets, but 1-3-nerved; *upper* linear, ciliate, nerveless, usually much shorter than the lower or obsolete.

Habitat: NATAL. *Gerrard* 670, 674; *var. podotrichus*, Umpumulo, *Buchanan*; Riet Vlei, *Buchanan*: Biggarsberg, *Rehmann* 7120, 7121; Farkkop, *Rehmann* 7668; without precise locality, *Buchanan* 62, 121; near Durban, *Wood*, 6050

Drawn from Wood's specimen.

Found all over Africa, also in Canary Islands and Madeira.

Peduncles having long tubercle-based hairs occur occasionally in the typical form in the Cape.

Fig. 1, Plant natural size; 2, spathe with 2-nate racemes. *Sessile spikelet*—3, lower glume, back view; 4, upper glume, side view; 5, lower valve, front view; 6, upper valve; 7, ovary, stamens, and lodicules. *Pedicelled spikelet* 8, lower glume, front view; 9, upper glume, front view; 10, lower valve, front view; 11, upper valve. *Except fig. 1, all enlarged.*

NATAL PLANTS.

VOL. 2.—PART 2.

GRASSES.

. . EDITED BY . .

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CURATOR OF NATAL BOTANIC GARDENS, DURBAN,

—— AND OF ——

NATAL GOVERNMENT HERBARIUM.

Title Page, Preface and Index will be published with the concluding part of the Volume.

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1900.

Andropogon auctus. *Stapf.*

PLATE 126.

ANDROPOGON AUCTUS (Stapf, Fl. Cap. Vol. vii. 357).

PERENNIAL.—CULMS erect, robust, up to 2 lines thick, 3-5 feet long, glabrous, simple or more or less branched and 3-5-noded below the panicle, longest internode over $\frac{1}{2}$ foot long. Sheaths tight, glabrous or hairy, the lowest crowded, compressed, subpersistent, the upper terete, shorter than the internodes; ligules oblong, up to $3\frac{1}{2}$ lines long. Blades linear, from a narrow, stoutly ribbed base, tapering to a long, fine point, up to $1\frac{1}{2}$ foot, by 1-$2\frac{1}{2}$ lines broad, glabrous or scantily hairy, glaucous.

PANICLE lax, narrow, up to $1\frac{1}{2}$ foot long. Racemes $\frac{3}{4}$-$1\frac{1}{2}$ line long, very villous, on slender, shortly and laterally exserted peduncles, having numerous long tubercle-based hairs near the curvature. Spathes, joints, pedicels and spikelets as in *A. hirtus*, except for the pedicelled spikelets having a muticous lower glume and subequal valves.

Habitat:—NATAL. Riet Vlei, *Buchanan* 222.

Figured from Buchanan's specimen in the Government Herbarium.

Fig. 1, Panicle, natural size. *Pedicelled spikelet*—2, lower glume, front view; 3, upper glume, front view; 4, lower valve; 5, upper valve. *Except fig. 1, all enlarged.*

PLATE 127.

ANDROPOGON RUFUS (Kunth. Enum. i. 492).

PERENNIAL.—CULMS erect, stout, 3-8 feet long, glabrous, 5-7-noded below the panicle. Sheaths quite glabrous (in the South African species), or hairy along the upper margins, terete, shorter than the internodes (except the lowest); ligules rounded, 1-2½ lines long, sometimes with hairs from behind. Blades linear from a narrow base, long tapering to a fine point, 1-2½ feet long, by 2-6 lines broad, flat, rigid, erect, glabrous, more or less scabrid, margins very rough, midrib stout, white above.

PANICLE usually large and much branched, lax, oblong, contracted or rather open, 1-1½, sometimes to 2 feet long. Spathes very narrow, linear-lanceolate to linear, finely acuminate, 1½-2 inches long, glabrous, scarious, reddish, erect or spreading. Common peduncles finely filiform, pubescent, sometimes with spreading yellowish tubercle-based hairs towards the tips, flexuous or pendulous, more or less (often long) exserted. Racemes slender, ¾-1 inch long, not spreading, often drooping; joints 6-10, filiform, obliquely truncate, up to 1 line long, shortly and densely ciliate, lower hairs white, upper reddish; pedicels very similar. *Sessile spikelets* all perfect, or sometimes the lowest of the sessile raceme like the pedicelled, male, or the latter sometimes barren. *Perfect spikelets* linear-oblong, 2-2½ lines long, yellowish or reddish. Glumes, *lower* sub-chartaceous, minutely truncate, dorsally flattened, glabrous or pubescent, with short rather rigid fulvous or ferruginous hairs, or sub-villous, intracarinal nerves about 5, evanescent below, callus shortly bearded, keels rigidly ciliate above; *upper* membranous, obtuse, 3-nerved. Valves, *lower* oblong, obtuse, ciliate, faintly 2-nerved; *upper* shortly bifid, 1-nerved, lobes oblong, ciliate. Awn ¾-1 inch long, bent at the middle, pubescent below the bend, minutely scaberulous above. Anthers 1 line long. *Pedicelled spikelets* lanceolate-linear, 2¼-2½ lines long, reddish or purplish, glabrous or pubescent to villous. Glumes, *lower* sub-herbaceous, acute, 7-nerved, keels rigidly ciliolate; *upper* acute, 3-nerved, ciliate. Valves, *lower* oblong, subacute, 1½ line long, 1-sub-3-nerved; *upper* narrow, linear, 1-nerved, ciliate, or both valves more or less reduced, or the upper quite suppressed.

Habitat:—ZULULAND. Moist places near Inyezaan River, *Wood* 3927.

Figured from Wood's specimen, the only one in the Government Herbarium, and no other one appears to have been sent Home from South Africa.

In our specimen the pedicelled spikelets contain the two glumes and a rudimentary lower valve, the upper valve being suppressed. This species is found also in Tropical Africa, the Mascarene Isles, and in Brazil.

Fig. 1, Culm with leaf and panicle, about natural size. *Sessile spikelet*—2, lower glume, back view; 3, upper glume, front view; 4, lower valve, front view; 5, upper valve with awn; 6, pistil, stamens and lodicules. *Pedicelled spikelet* –7, lower glume; 8, upper glume; 9, lower valve. *Except fig. 1, all enlarged.*

Andropogon rufus. Kunth.

Andropogon Dregeanus, *Nees.*

PLATE 128.

ANDROPOGON DREGEANUS (Nees, Fl. Afr. Austr. 112).

PERENNIAL, compactly tufted. —CULMS erect, rather slender, 3-4 feet long, glabrous, shining, about 5-noded below the panicle. Sheaths of innovation shoots compressed, fugaciously tomentose at the base, sheaths of the culms terete, quite glabrous or the upper scantily hairy, smooth ; ligules obtuse, up to $2\frac{1}{2}$ lines long, hairy behind. Blades linear from a narrow base, tapering to a fine point, up to 1 foot long, by 2-3 lines broad, erect, rather rigid, flat, glabrous or the uppermost scantily hairy, sub-glaucous, turning reddish, scabrid, margins spinulous.

PANICLE narrow, 1-$1\frac{1}{2}$ foot long, remotely branched, contracted. Spathes narrow, lanceolate, acute, about $1\frac{1}{2}$ inch long, scarious, reddish. Common peduncles finely filiform, long exserted, glabrous except the strongly curved or curled tips, which are densely beset with long spreading, yellowish tubercle-based hairs. Racemes $\frac{1}{2}$-1 inch long, lax, scarcely spreading ; joints 5-10, filiform, obliquely truncate, up to $1\frac{1}{2}$ line long, shortly ciliate ; pedicels very similar. Spikelets of the lowest pair of the sessile raceme alike, male, the sessile of all the other pairs perfect, the pedicelled male, or sometimes with stamens and an apparently perfect pistil. *Sessile perfect spikelets* linear-oblong, 2 lines long, purplish, pale below. Glumes, *lower* sub-chartaceous above, membranous near the base, minutely truncate, dorsally flattened, glabrous or minutely and scantily pubescent or villous, intracarinal nerves about 5, evanescent below the tip ; keels rigidly ciliate above, callus shortly bearded ; *upper* membranous, 3-nerved, nerves scabrid above. Valves, *lower* oblong, obtuse, faintly 2-nerved, ciliate ; *upper* shortly bifid, 1-nerved, lobes oblong, obtuse, ciliate. Awn about 6-8 lines long, very slender, pubescent and kneed below the middle. Pale ovate, obtuse, $\frac{1}{2}$ line long. Anthers $\frac{3}{4}$ line long. *Pedicelled spikelets* oblong-linear, $2\frac{1}{2}$ lines long, dull purplish, glabrous or hairy. Glumes, *lower* sub-herbaceous, acute, 9-11-nerved ; *upper* very acute, 3-nerved, long ciliate. Valves, *lower* linear-oblong, obtuse, equalling the glumes, 3-nerved ; *upper* $\frac{1}{4}$-$\frac{1}{3}$ shorter, spathulate-linear from an extremely fine base, sub-1-nerved. Anthers more than 1 line long.

Habitat :—NATAL. Between Umtata and St. John's, *Drège* ; between Umzimkulu and Umkomaas Rivers, *Drège* ; near Estcourt, *Rehmann* 7310 ; Karkloof, *Wylie (Wood* 6010).

Figured from Wood's 6010.

Fig. 1, Plant about natural size ; 2, ligule. *Sessile spikelet*—3, upper valve ; 4, pale. *Pedicelled spikelet*—5, lower valve ; 6, upper valve. *Except fig. 1, all enlarged.*

PLATE 129.

ANDROPOGON DICHROOS (Steud. Syn. Pl. Glum. i. 389).

PERENNIAL.—CULMS rather slender, erect, over 2 feet long, glabrous, terete, 4-5-noded and simple below the panicle. Sheaths terete or slightly keeled in the upper part, tight, glabrous, shorter than the internodes, except the sub-persistent lowest ones; ligules membranous, rotundate-ovate, ciliolate, up to 1 line long. Blades linear from a rounded base, long tapering to a fine point, over $\frac{1}{2}$ foot long, by $1\frac{1}{2}$-$3\frac{1}{2}$ lines broad, glabrous or scantily hairy at the base, scabrid below and along the margins, turning reddish.

PANICLE oblong, about 1 foot long, lax. Spathes very narrow, lanceolate, acuminate, $1\frac{1}{2}$-2 inches long, obliquely erect or divaricate, reddish, glabrous or spreadingly hairy, particularly below. Common peduncles filiform, more or less curved at the upper end, or at length strict, shortly exserted from near the tip of the spathe or shortly exceeding it, with long, spreading tubercle-based hairs below the tip. Racemes 4-10 lines long, at length horizontally spreading, or deflexed, on very short hirsute peduncles, falling together from the tip of the common peduncle; joints 2-5, filiform, obliquely truncate, $1\frac{1}{4}$ line long, shortly ciliate; pedicels very similar. Spikelets of the lowest pair of the sub-sessile raceme alike, barren, the sessile of all the other pairs perfect, the pedicelled barren. *Perfect spikelets* oblong, lanceolate, 2 lines long, pale. Glumes, *lower* sub chartaceous above, membranous towards the base, truncate, or minutely 2-toothed, dorsally flattened, scantily pubescent to almost villous, with whitish, or above with reddish hairs, intracarinal nerves 5-7, evanescent below; keels rigidly ciliate above, callus shortly bearded; *upper* rigidly membranous, obtuse, 3-nerved, ciliate above. Valves, *lower* oblong, truncate, faintly 2-nerved, ciliate; *upper* shortly 2-toothed, glabrous. Awn slender, $\frac{3}{4}$-1 inch long, kneed and pubescent below the middle. Pale 0. Anthers $\frac{2}{3}$-$\frac{3}{4}$ line long. *Pedicelled spikelets* linear-lanceolate, up to $2\frac{3}{4}$ lines long, rufously hirsute. Glumes, *lower* acuminate, sometimes mucronate, 9-11-nerved; *upper* 3-nerved, ciliate above. Valves 0, or the lower broadly oblong, up to $\frac{3}{4}$ line long, ciliate, and the upper reduced to a microscopic ciliate scale.

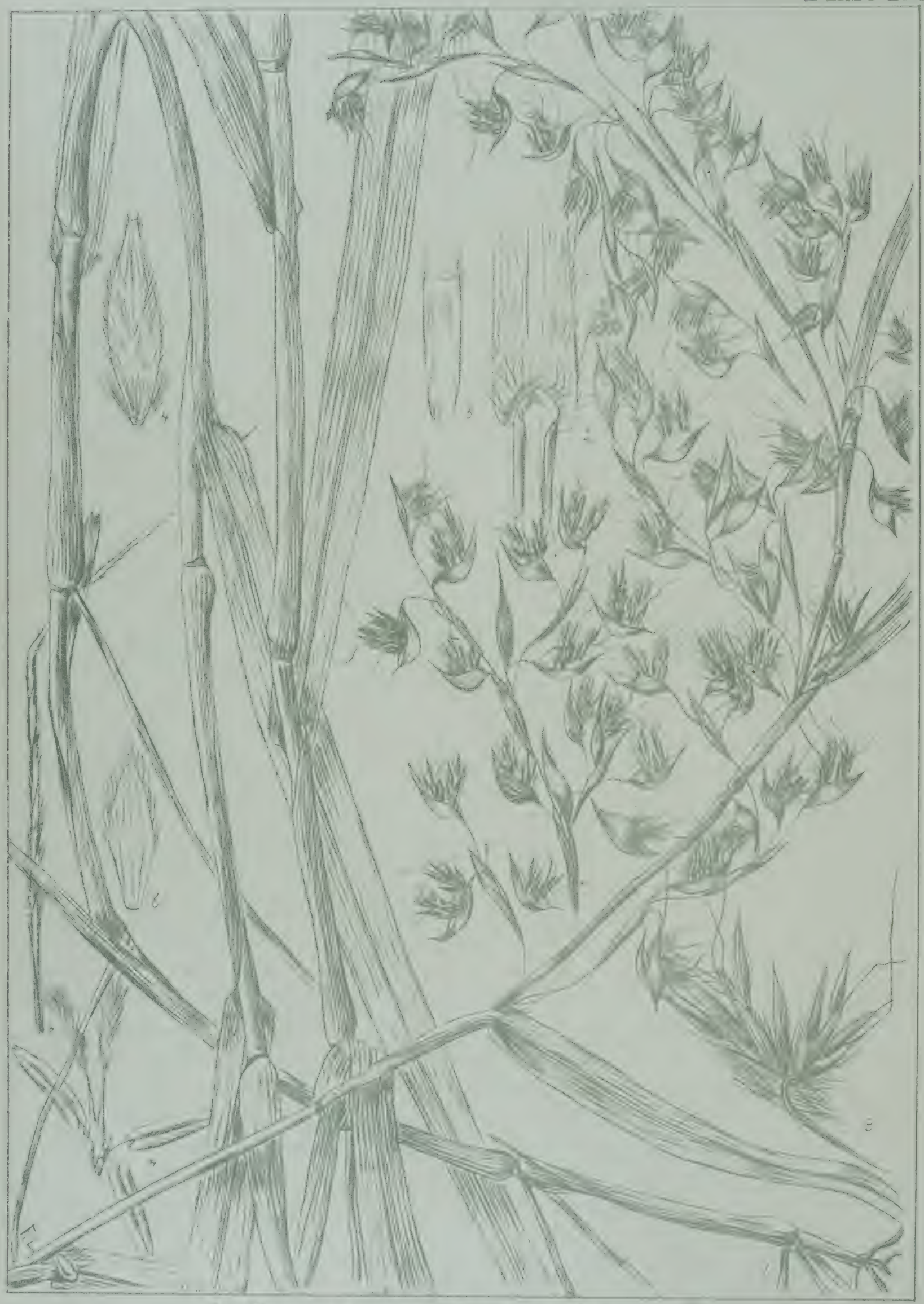
Habitat:—NATAL. *Drège* 4357; Umpumulo, *Buchanan*; Biggarsberg, *Rehmann* 7116; without precise locality, *Buchanan* 303.

Figured from Buchanan's specimen in the Government Herbarium.

In the specimen in the Herbarium the panicle is more than 1 foot long.

Fig. 1, Culm, leaf and panicle about natural size. *Sessile spikelet*—2, lower glume; 3, upper glume; 4, lower valve; 5, pistil, stamens and lodicules; 6, upper valve. *Pedicelled spikelets*—7, lower glume; 8, upper glume. *Except fig. 1, all enlarged.*

Andropogon dichroos, *Steud.*



Andropogon cymbarius, *Linn.*

PLATE 130.

ANDROPOGON CYMBARIUS (Linn. Mant. 11, 303, not Hack.).

PERENNIAL (?).—CULMS erect, usually from a very slender and sometimes ascending base, 3-6 feet or more long, often rooting from the lower nodes, terete, glabrous, 6-10-noded, simple or branched. Sheaths glabrous, rarely hirsute with tubercle-based hairs, or villous at the nodes, terete or keeled in the upper part, the lowest whitish, withering or thrown off, the middle and upper usually shorter than the internodes. Ligule membranous, rounded or truncate, very short. Blades linear from a narrow base, long tapering to a fine point, $\frac{1}{2}$ to over $1\frac{1}{2}$ foot, by 3-6 lines, rarely narrower, rigid to subflaccid, flat, glabrous or subhirsute at the base from tubercle-based hairs, scaberulous or smooth except the scabrid or spinulous margins, glaucous.

PANICLE leafy, almost overtopped by its blades, linear-oblong, decompound, usually dense, $\frac{1}{2}$-2 feet long. Spathes obliquely ovate, acute or acuminate, 5-9 lines long, scarious, often brilliantly red or purple, glabrous. Common peduncles filiform, enclosed, spreadingly hirsute above. Racemes usually half exserted from the middle of the spathe and at a right angle to it, $2\frac{1}{2}$-$4\frac{1}{2}$ lines long, dense, subcontiguous, subsessile, with a tuft of long rigid yellowish hairs at the base of the lower; joints 1-3, filiform, truncate, $\frac{1}{2}$ line long, ciliate; pedicels very similar, the terminal up to 1 line long. Spikelets of the lowest pair of the lower raceme alike, male or barren, the sessile of all the other pairs perfect, the pedicelled male or barren. Perfect spikelets oblong, $1\frac{1}{2}$-2 lines long, pale. Glumes, *lower* thinly chartaceous, minutely truncate, dorsally flattened, subglabrous or pubescent, intracarinal nerves 3-5, mostly evanescent below the tip; keels spinulously ciliate above; callus very short, bearded; *upper* membranaceous, obtuse, 3-nerved, nerves scabrid or ciliate above. Valves, *lower* linear-oblong, truncate, obscuredly 2-nerved or nerveless, subglabrous; *upper* minutely 2-toothed, almost reduced to a reddish fine geniculate awn, 5-10 lines long. Pale 0. Stamens up to 1 line long. *Pedicelled spikelets* oblong-lanceolate to oblong, 2-3 lines long, pale to deep reddish, glabrous or pubescent. Glumes, *lower* subherbaceous, acutely acuminate, 7-9-nerved; keels spinulously ciliate; *upper* acute, 3-nerved, ciliate. Valves, *lower* oblong, obtuse, up to $1\frac{1}{2}$ line long, faintly 1-sub-3-nerved; *upper* linear to cuneate-linear, 1 line long or reduced, or 0. Anthers, if present, up to 1 line long.

Habitat:—NATAL. Umpumulo, *Buchanan* 228; Laing's Nek, *Rehmann* 6939; Inanda, *Wood* 1304; without precise locality, *Cooper* 3346. *Var. lepidus* (Stapf) besween Umzimkulu and Umkomaas, *Drège;* Umpumulo, *Buchanan* 229; Zululand, Entumeni, *Wood* 3991.

Fig. 1, Portion of plant and panicle, about natural size; 2, ligule; 3, racemes, spathe removed. *Sessile spikelet*—4, lower glume, ; 5, lower valve; 6, upper valve; 7, pistil, stamens and lodicules. *Pedicelled spikelet*—8, lower valve. *Except fig. 1, all enlarged.*

PLATE 131.

ANDROPOGON FILIPENDULUS (Hochst. in Flora, 1846, 115).

PERENNIAL (always ?).—CULMS erect, slender, 2-10 feet long, glabrous, more or less branched; branches erect, intravaginal, leafy. Sheaths terete, sub-carinate above, tight or ultimately slipping from the culm, glabrous or the lower sparingly hairy. Ligules membranous, truncate, about 1 line long. Blades linear, tapering to an acute, often very fine point, 1-2 feet long, by $\frac{3}{4}$-3 lines broad, flat or subconvolute, glabrous, rarely sparingly hairy, smooth or scaberulous, margins rough.

PANICLE narrow, $\frac{1}{2}$-$1\frac{1}{4}$ foot long, contracted; branches erect, strict, filiform, from lanceolate to linear, long and setaceously acuminate sheaths. Spathes very narrow, linear, 2 inches long, glabrous or finely hairy along the margins. Common peduncles capillary, enclosed in the spathes except the flexuous or pendulous or finely strict upper part, which is pubescent and very long but very scantily bearded. Racemes subcontiguous, slender, unequally peduncled (the longer peduncle 2-5 lines long, glabrous or hairy), 5-6 lines long; joints filiform, up to $\frac{3}{4}$ line long, glabrous or sub-glabrous, pedicels somewhat longer, the upper ciliate. *Sessile spikelets*, 2 in the lower, 3 in the upper raceme, in both only the upper perfect, the others male like the pedicelled spikelets. *Perfect Spikelets* oblong-linear, 2-$2\frac{1}{2}$ lines long, pale, tips reddish; callus fine, acute, up to 1 line long, densely bearded. Glumes, *lower* sub-chartaceous, truncate, glabrous or more or less hairy, intracarinal nerves about 5, prominent all along, or only upwards, not pitted; *upper* membranous, truncate, 3-nerved, glabrous. Valves, *lower* linear-oblong, $1\frac{1}{2}$ line long, nerveless or almost so, reversely ciliate; *upper* very finely cuneate-linear, obscurely 2-toothed, passing into a stout awn $1\frac{1}{2}$-$2\frac{1}{2}$ inches long, rufus hispidulous below. Pale 0. Anthers $1\frac{1}{2}$ line long. *Male spikelets* lanceolate to linear, sub-acuminate, $2\frac{1}{2}$-$3\frac{1}{2}$ lines long, dull purplish, glabrous. Glumes, *lower* 9-11-nerved, muticous in the lower, aristulate in the upper pairs; *upper* acute, 3-nerved, reversely ciliate. Valves oblong, obtuse; *lower* 1-nerved; *upper* nerveless, up to $1\frac{1}{2}$ line long.

Habitat:—NATAL. Throughout the Colony, *Krauss* 28; near Durban Bay, *Krauss* 164, partly; Umpumulo Common, *Buchanan* 223; Zululand, *Jenkinson* 70 (*Wood* 7342); 31; Berea, *Wood* 5933.

Figured from Jenkinson's 70.

In Wood's 5933, and Jenkinson's 70, the number of perfect spikelets is not constant; in the upper glume of the sessile spikelet the margins are hyaline and reversely ciliate, and the upper valve is ciliate and 3-nerved. In the pedicelled spikelets the upper valve is not always present, or when present is very small.

Mr. Jenkinson says of his No. 31: "Very common on any well drained ground, liked by cattle; even in winter; used by natives for thatching. Native name 'Sibuzana.'"

Found also in tropical Africa and Ceylon, and in a somewhat different form in Australia (*A. lachnantherus Bth*).

Fig. 1, Plant about natural size; 2, ligule; 3, 2-nate racemes. *Sessile spikelet*—4, lower glume, front view; 5, upper glume, side view; 6, lower valve; 7, stigmas, stamens and lodicules; 8, upper valve with lower portion of awn. *Pedicelled spikelet*—9, muticous lower glume; 10, upper glume; 11, lower valve. *Except fig. 1, all enlarged.*

Andropogon filipendulus, *Hochst.*

Plate LII

Andropogon Ruprechtii Hack

PLATE 132.

ANDROPOGON RUPRECHTI (Hack. Androp. in DC. Monogr. Phan. VI. 645).

PERENNIAL, densely tufted.—CULMS erect, stout, up to 6 feet long, glabrous, terete, simple or with a leafy branch from one of the uppermost internodes. Sheaths glabrous, pale, striate, tight or somewhat loose, the lowest and those of the innovation shoots keeled, subpersistent, the upper keeled in the upper part, otherwise terete. Ligules membranous, obtuse, up to $1\frac{1}{2}$ line long. Blades narrow, linear from a narrow base, tapering to a fine point, $\frac{1}{2}$-1 foot, by $1\frac{1}{2}$-$2\frac{1}{2}$ lines, flat or revolute along the margins, rigid, glabrous, smooth or scabrid, midrib rather stout.

PANICLE linear to oblong, erect, stiff, up to more than 1 foot long, branches filiform, erect, glabrous, from long narrow glabrous or hairy spathiform sheaths. Spathes very narrow, linear-lanceolate, acuminate, $1\frac{1}{2}$-2 inches long, subscarious to almost herbaceous, pale, reddish or greenish, usually glabrous. Common peduncles filiform, strict, glabrous, enclosed. Racemes about 10 lines long, laterally exserted from the spathe, one subsessile with one sessile male spikelet at the base, and one sessile perfect one above, the other peduncled with one sessile perfect, and two pedicelled male spikelets; peduncle of the upper, and joint of the subsessile raceme, filiform, glabrous, 2, and 1 line long, respectively, each with a hyaline lanceolate 1-2 toothed bract-like appendage about 3 lines long; lowest pedicel very short, glabrous; upper up to 2 lines long, very densely and shortly ciliate. *Perfect spikelets* subcylindric, over 3 lines long, pale, callus very slender, pungent, $1\frac{1}{2}$ line long, densely bearded. Glumes subcoriaceous, glabrous except the hispidulous tips; *lower* oblong 2-cuspidate (points up to $1\frac{1}{2}$ line long), finely channelled, inconspicuously 8-10-nerved, margins implicate, sharply so on the extreme tips, otherwise involute; *upper* lanceolate-oblong, sub-5-nerved. Valves, *lower* linear-obtuse, $2\frac{1}{2}$ lines long, 2-nerved, scantily ciliate; *upper* slightly shorter, stipitiform, obscurely 2-toothed, hyaline and 3-nerved at the base. Awn 2-3 inches long, bent near the middle, rufous pubescent below the bend. Pale 0. Anthers 1-$1\frac{1}{4}$ line long. *Male spikelets* narrow, linear-lanceolate, about 5 lines long, glabrous. Glumes, *lower* subherbaceous, acute or in the upper spikelets narrowed into a scabrid bristle (up to 2 lines long), 7-11-nerved, keels spinulously ciliate; *upper* 3-nerved, ciliate. Valves subequal, 3-nerved, ciliate. Anthers 2 lines long.

Habitat:—NATAL. Zululand, *Jenkinson* 72 (*Wood* 7341).

Figured from Jenkinson's specimen, which is the only one in the Government Herbarium.

Also in Tropical Africa, Madagascar, Transvaal and Mexico.

So far as we are aware this grass has not previously been collected in Natal. The leaves of our specimen are pilose with long white hairs, and similar hairs are found on the peduncle of the 2-nate racemes. Mr. Jenkinson says, "a very good grass for thatching, native name um-Tshaba."

Fig. 1, Portion of stem, leaves and inflorescence, about natural size; 2, ligule; 3, spathe and 2-nate racemes. *Sessile spikelet*—4, lower glume, front view; 4a, same, back view; 5, upper glume; 6, lower valve; 7, upper valve; 8, pistil, stamens and lodicules. *Pedicelled spikelet*—9, lower glume; 10, upper glume; 11, lower valve; 12, upper valve. *Except fig. 1, all enlarged.*

PLATE 133.

ANTHISTIRIA IMBERBIS (Retz, Obs. iii. 11.)

PERENNIAL, densely tufted; innovation shoots intravaginal.—CULMS erect or geniculate and ascending, 1-3 feet long, rather slender, glabrous, simple or branched. Sheaths compressed, keeled, firm, glabrous or the lower sometimes hairy and bearded at the nodes, exceeding the internodes, except the upper. Ligules membranous, very short, obtuse or truncate, ciliolate. Blades linear, long tapering to a fine point, 2-8 inches long, by 1-2½ lines broad, very rarely broader, flat, rather rigid, glabrous or hairy below.

PANICLE narrow, often nodding, 3-6 inches long, scantily branched, branches solitary, or the upper 2-3-nate, filiform, glabrous, bearing capituliform, usually dense, fascicles of racemes. Spathes lanceolate, obtusely acuminate, about 1 inch long, rarely longer, usually bearded at the base, glabrous or hairy, greenish or reddish. Racemes 6-9 lines long.

Involucral spikelets whorled, sessile, persistent, lanceolate, acute or acuminate, 3½-5 lines long, rarely longer, glabrous or with scattered, short, tubercle-based hairs, male; their lower glumes not, or very obscurely winged on one side only. Valves, *lower* generally present. *Pedicelled spikelets* linear-lanceolate, glabrous, on short glabrous or subglabrous pedicels. *Perfect spikelet* 1, not exserted from the involucre, linear-oblong, subcylindric, 2½-3½ lines long, callus pungent, up to 1½ line long, glabrous in front, otherwise densely bearded with shining reddish or purplish hairs. Glumes, *lower* obtuse or emarginate, smooth and shining except the rigidly pubescent or scabrid tip, obscurely 7-9-nerved; *upper* glabrous. Valves, *lower* glabrous, somewhat shorter than the glumes; awn of upper valve 2½ inches long. Anthers 1 line long. Grain about 2 lines long.

Habitat:—NATAL. Bank of Tugela River (a form with very broad leaves), *Buchanan* 227; between Umzimkulu and Umkomaas Rivers, *Drège;* near Dundee, *Green*, var.; Mooi River, 4-5000 feet alt, *Mason* 23, partly; Dundee, 4-5000 feet alt., *Green* 44; Mooi River, *Mason* 42, 47; Zululand, *Jenkinson* 28; near Maritzburg, *St. George.*

Drawn from Green's specimen.

This species or some of its varieties are found throughout the tropics of the Old World. Jenkinson says of his No. 28, which is a variety of the species: "Native name Insinda, hill tops and upland slopes, one of the most useful grasses for all kinds of stock in spring and summer, gets very dry in winter."

Fig. 1, Portion of plant and inflorescence, natural size; 2, ligule; 3, raceme. *Pedicelled spikelet*—4, lower glume. *Involucral spikelet*—5, lower glume; 6, upper glume; 7, lower valve. *Sessile spikelet*—8, lower glume; 9, upper glume; 10, lower valve; 11, upper valve with portion of awn; 12, pistil, stamens and lodicule. *Except fig. 1, all enlarged.*

Anthisteria imberbis *Retz.*

Paspalum serobiculatum. *Linn.*

PLATE 134.

Paspalum scrobiculatum (Linn. Mant. 29).

Perenniál ?—Culms fascicled on a very short praemorse rhizome, innovation shoots few, usually intravaginal. Culms erect, rarely ascending from a prostrate rooting base, 1 to several feet long, usually sheathed throughout, glabrous. Leaves glabrous or more or less softly hairy; sheaths lax, rather thin, the lower often purplish; ligules membranous, short. Blades linear to linear-lanceolate, acute to acuminate, 4-8 inches (rarely longer in the African specimens), by 2-4 lines wide, soft, flat or with involute margins. False spikes 2-3 (in the South African specimens), or more. Rhachis herbaceous, 1-1½ line broad, margins rigidly ciliate. Pedicels very short, almost wholly adnate. Spikelets 2, rarely 3-4 ranked, falling entire from the pedicels, imbricate, broadly elliptic to orbicular, obtuse, 1-1½ line long, glabrous. Glumes, *lower* 0; *upper* convex, 3-7-nerved, as long as the valves, rarely shorter, or obsolete. Valves, *lower* flat, often obscurely pitted or wrinkled near the margin, 5-7-nerved, submarginal nerves 2 on each side, very close; *upper* subcoriaceous, brown, shining. Pale subequal to and of the same nature as the valve, 2-nerved, the flaps auricled; lodicules 2, cuneate. Stamens 3, anthers over ½ line long, styles distinct, slender; stigmas laterally exserted near the tip of the floret. Grain tightly enclosed by the slightly hardened valve and pale, dorsally subcompressed, hilum basal, embryo less than half the length of the grain.

Habitat:—Natal. In swamps by the Umlaas River, *Krauss* 147; grassy plains between Durban and Umlaas, *Krauss* 204; Umpumulo, *Buchanan* 184; without precise locality, *Gerrard* 587; near Newcastle, *Buchanan* 175; near Durban, March, *Wood* 6048; near Maritzburg, *St. George* 6a; near Dundee, *Green* 34; Zululand, *Jenkinson* 46.

A recent number of the "Kew Bulletin" says of this Grass:—"Kodo or Koda Millet of India. An erect growing annual grass, with stems about 2 feet high. It is widely dispersed through the tropics of the Eastern Hemisphere, generally regarded as a valuable pasture grass, and as an ingredient for hay. It sometimes attains a height of 6 to 8 feet. The grain is largely used as food by the natives of India, but it is by no means a wholesome article of diet. Unless special precautions are taken, it is liable to act as a narcotic poison. Cattle, and especially buffaloes, eat the grass readily when it is young. The straw is occasionally used as fodder. Animals are, however, carefully excluded from the fields when the crop is ripening as they appear to suffer even more than men from the ill effects of Kodra poisoning." It is the "Ditch Millet" of New South Wales, and the "Herbe à épée" of Mauritius. This grass is widely spread in Natal, but so far as our observation at present goes it is nowhere very plentiful. Native name Samowisana.

Fig. 1, Ligule; 2, rhachis after spikelets have fallen; 3, upper glume; 4, lower valve; 5, upper valve, front view; 6, same, back view; 7, pale; 8, pistil, stamens and lodicules. *Except fig. 1, all enlarged.*

PLATE 135.

PASPALUM DISTICHUM LINN. (Amoen. Acad. v. 391).

PERENNIAL.—CULMS ascending from a creeping, rooting, often very long and branched base, many-noded, sheathed throughout. Leaves numerous, distichous, imbricate below. Sheaths thin, pale, glabrous except the often bearded mouth, the lower at length loose ; ligules very short, truncate, with fine hairs from behind ; blades linear, acute, 2-4 inches long, by 1-1½ line wide, spreading, involute, rarely flat, glabrous. False spikes 2-nate, both pedunculated and articulated on the top of the culm, rarely 3-nate, often spreading. Rhachis herbaceous, ½ line broad, margins scabrid.

SPIKELETS subsessile, falling entire from the short pedicels, solitary, oblong, acute to acuminate, 1-2 lines long, dorsally flattened, imbricate and adpressed to the rhachis, glabrous, pale. Glumes, *lower* 0 ; *upper* slightly convex, 5 or 4 nerved (middle nerve suppressed) side nerves close, sub-marginal. Valves, *lower* very like the glume, middle nerve always percurrent, side nerves 2-3 on each side, submarginal ; *upper* distinctly shorter, subcoriaceous, 5-nerved, smooth, pale. Pale obscurely auricled. Stamens 3 ; anthers ¾ line long. Styles and stigmas as in *P. scrobiculatum.* Grain ½ line long.

Habitat :—NATAL. Coast marshes, *Buchanan* 84 ; without precise locality, *Gerrard* 590 ; Clairmont, 50 feet alt., March, *Wood* 6043.

Drawn from Wood's specimen which was certified by Professor Hackel, and is the only authentic specimen in the Government Herbarium.

Found in most warm countries. Baron Mueller says of this grass : " The Silt grass," a creeping bank or swamp grass forming extensive cushions. It keeps beautifully green throughout the year, affords a sufficiently tender blade for feed, and is exquisitely adapted to cover silt or bare slopes on banks of ponds or rivers, where it grows grandly ; moderate submersion does not destroy it, but frost injures it : it thrives well also on salt marshes. Excellent for fern tree tubs to produce a green sward and some overdrooping foliage. The chemical analysis made in spring gave the following results : Albumen 2·20 ; gluten 7·71 ; starch 1·56 ; gum 1·64 ; sugar 5·00."

Fig. 1, Ligule ; 2, rhachis with one spikelet ; 3, upper glume ; 4, lower valve ; 5, upper valve ; 6, pale ; 7, stamens, pistil and lodicules. *Except fig. 1, all enlarged.*

Paspalum distichum, *Linn.*

Digitaria monodactyla. *Stapf*

DIGITARIA, LINN.

Spikelets lanceolate to elliptic-oblong, flat in front, convex on the back, falling entire from the pedicels, usually 2-3-nate, and pedicelled on the triquetrous or dilated rhachis of very slender and usually spiciform racemes or false spikes ; lower floret barren reduced to the valve and a very minute rudimentary pale ; upper perfect. Pale of upper floret subequal to the valve, 2-nerved, of the same texture. Lodicules 2, minute, broadly cuneate. Stamens 3. Styles distinct ; stigmas laterally exserted near the tip of the floret. Grain tightly enclosed by the slightly hardened rigid valve and pale, oblong, slightly dorsally compressed ; hilum basal, punctiform ; embryo less than half the size of the grain.

PLATE 136.

Digitaria monodactyla (Stapf, Fl. Cap., Vol. VII., p. 373).

Perennial, compactly tufted, innovation shoots intravaginal.—Culms very slender, erect, 1-1½ foot long, glabrous, 1-2-noded above the base, simple.

Leaves crowded at the base. Sheaths very tight, glabrous, or scantily hairy, the lower firm, persistent, at length sometimes breaking up into fibres. Ligules very short, truncate. Blades setaceously convolute, filiform, 2-4 inches long, rather rigid or flexuous, glabrous or scantily hairy, smooth. Racemes spikelike, solitary, terminal on the long exserted culm, very slender, 2½-5 inches long ; rhachis wavy, very narrow, ciliate, midrib obtuse, stout. Pedicels 2-nate, densely ciliate, unequal, the longer up to ¾ line long.

Spikelets subimbricate, adpressed to the rhachis, the superposed ones distant almost by their own length, oblong-lanceolate, up to 1½ line long, with silky and adpressed hairs. Glumes, *lower* 0 ; *upper* linear-oblong, ¾ to almost 1 line long, long and densely ciliate, 3-2-nerved. Valves, *lower* oblong-lanceolate, subacuminate, up to 1½ line long, 5-7-nerved, densely and long ciliate, particularly along the marginal nerves ; *upper* 3-nerved, subchartaceous, ovate-lanceolate, subacuminate, 1 line long, smooth, brown ; flaps of pale very broad below, overlapping. Anthers ½ line long.

Habitat :—Natal. Near Newcastle, *Buchanan* 181 ; also in Cape Colony and Free State.

Drawn from Buchanan's specimen, which is the only one in the Government Herbarium.

Digitaria has lately been separated from *Panicum*, of which genus it forme[1] a section.

Fig. 1, Ligule ; 2,portion of rhachis with spikelets ; 3, upper glume ; 4, lower valve, front view ; 5, same, back view ; 6, upper valve ; 7, pale ; 8, stigmas, stamens and lodicules. *Except fig. 1, all enlarged.*

PLATE 137.

DIGITARIA ERIANTHA (Steud. in Flora, 1829, 468).

PERENNIAL, densely tufted. Rhizome short, praemorse.—CULMS erect or geniculate, rather stout, 1½-3 feet long, glabrous, 2-4-noded, usually simple, sometimes scantily branched below. Sheaths striate, rather loose, the upper shorter than the internodes, the lowest more or less hirsute-tomentose at the base, otherwise glabrous or scantily hirsute ; ligules hyaline between the more or less produced margins of the sheath-mouth, 1½-4 lines long. Blades linear, tapering to a fine point, ½-1 foot long, by 1-2 lines wide, or the lowest sometimes much shorter, flat or with the margins revolute, rigid, rarely flaccid, glaucous, glabrous or scantily hairy at the base, margins scabrous above.

RACEMES 4 to many, subdigitate, slender, erect, or suberect, 4-8 inches long, straight or flexuous, sometimes pinkish ; rhachis very slender, triquetrous, angles scarcely winged, scabrid, internodes up to 1 line long, rarely longer. Pedicels 2-nate, filiform, scabrid, unequal, the longer 1 line, rarely 1½ line long.

SPIKELETS oblong or ovate-lanceolate, 1¼-1½ line long, sub-adpressed, pale green, often silvery. Glumes, *lower* membranous, ovate, acute or obtuse, up to ¼ line long, nerveless ; *upper* lanceolate, acute, about 1 line long, 3-nerved, with 4 lines of very fine, usually adpressed, long silky hairs. Valves equal, *lower* oblong, or ovate-lanceolate, acute, 7-9-nerved, inner 4 side nerves like the middle nerve very prominent, marginal nerves faint, lines of usually adpressed dense long silky hairs between the inner pair of side nerves and along the margins ; *upper* subchartaceous, oblong, shortly acuminate, 3-nerved, dull green. Anthers ¾ line long.

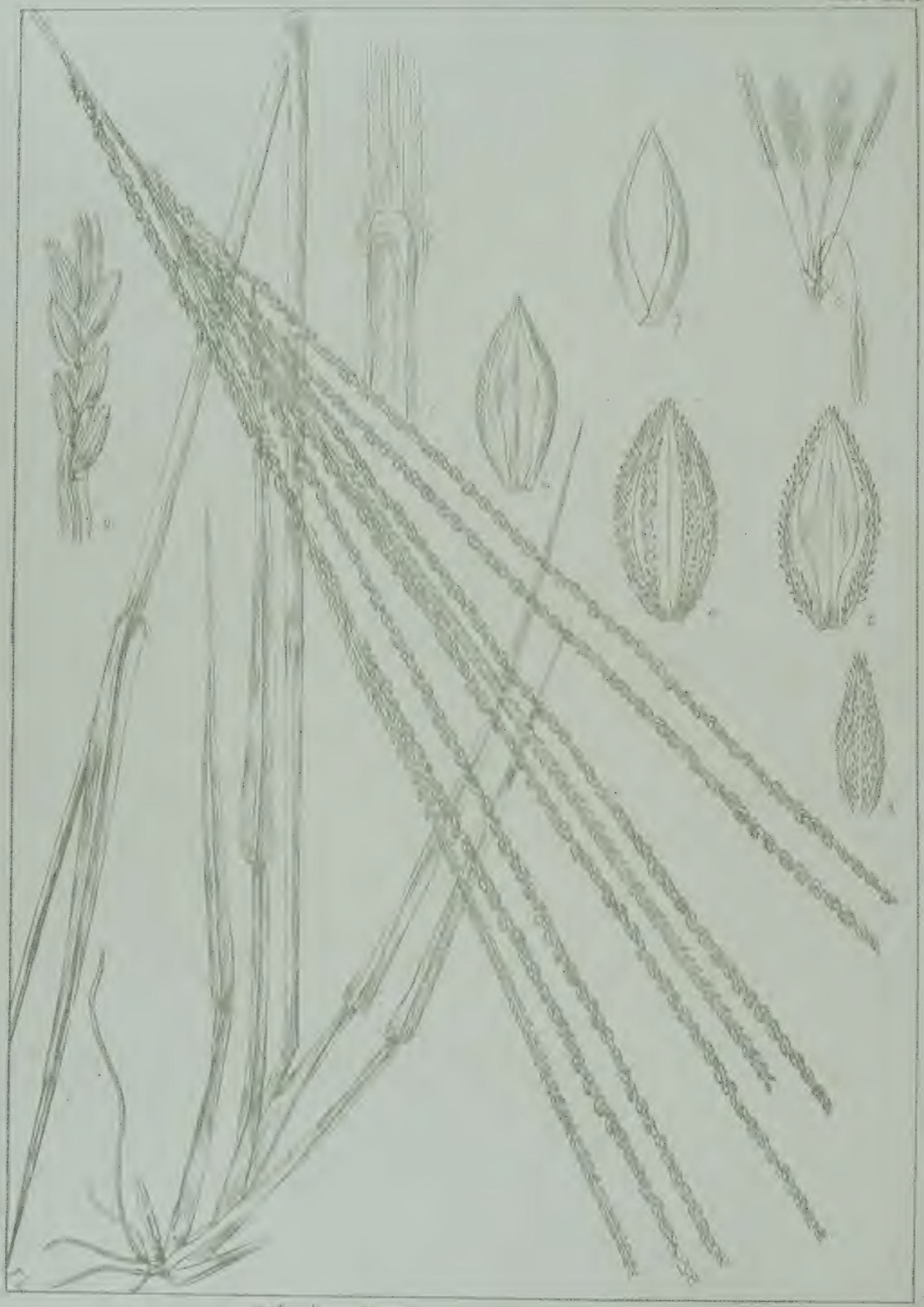
Habitat :—NATAL. *Plant* 62 ; between Umzimkulu and Umkomaas Rivers, *Drège ;* coast regions, *Sutherland ;* Nottingham, *Buchanan* 133 ; very common near Umpumulo, *Buchanan* 208 ; without precise locality, *Gerrard* 467 ; Zululand, *Jenkinson* 9 ; near Durban, *Wood* 7634.

Drawn from Jenkinson's specimen and compared with Buchanan's 208 and Wood's 7634.

Mr. Jenkinson says of this grass : "Good for cattle ; found in scattered tufts. A favourite grass for ticks. Used by natives for plaiting bracelets."

Fig. 1, Ligule ; 2, rhachis with spikelets ; 3, upper glume ; 4, lower valve ; 5, upper valve ; 6, pale ; 7, ovary, styles, stigmas, stamens and lodicules. *Except fig 1, all enlarged.*

Digitaria eriantha, *Steud.*



Digitaria ternata, *Stapf.*

PLATE 138.

DIGITARIA TERNATA (Stapf, Fl. Cap. Vol. VII. 376).

ANNUAL.—CULMS fascicled, erect from a geniculate base, slender, simple, $\frac{1}{2}$-2 feet long, glabrous or more or less beset with fine long spreading hairs below the racemes; about 2-noded. Sheaths glabrous or scantily fimbriate at the mouth. Ligules short, truncate. Blades linear-lanceolate to linear, acute, 2-9 inches by 3 lines, flat, flaccid, glabrous or sparingly hairy near the base.

RACEMES 2-7, subdigitate, erect or spreading, very slender, strict, 2-12 inches long. Rhachis very narrow, linear, up to $\frac{1}{2}$ line broad, margins scabrid, internodes about $1\frac{1}{2}$ line long. Pedicels 2-3-nate, unequal, up to more than 1 line long, shortly hairy towards the scarcely thickened tips.

SPIKELETS adpressed to the rhachis, oblong-elliptic, obtuse or sub-obtuse, about 1 line long, pale. Glumes, *lower* 0; *upper* very delicate, narrower and shorter than the upper valve, 3-nerved, sides densely villous with clavate hairs. Valves subequal; *lower* prominently 5-nerved, very densely and appressedly silky villous with clavate hairs; *upper* chartaceous, ovate-oblong, subacute, dark-brown to black except the whitish hyaline margins. Anthers $\frac{1}{2}$ line long.

Habitat:—NATAL. Near Umpumulo, 2000 to 2500 feet, *Buchanan* 203; 205; and without precise locality 77; Dundee, *Green* 83.

Also in Abyssinia and India.

Drawn from Green's specimen and compared with Buchanan's 203 and 205.

Though this species is said to have no lower glume, a microscopic rudiment of it may often be seen at the base of the upper one.

In the Flora of British India this plant is described as *Paspalum ternatum*, Hk. f., and it is said by Schimper to be a pest in cultivated fields.

Fig. 1, Ligule; 2, rhachis with spikelets; 3, upper glume; 4, lower valve, back view; 5, same, front view; 6, upper valve; 7, pale; 8, ovary, style, stigmas, stamens and lodicules. *All enlarged.*

PLATE 139.

DIGITARIA SETIFOLIA (Stapf, Fl. Cap. Vol. VII. p. 376).

PERENNIAL, densely caespitose.—CULMS erect, very slender, $\frac{1}{3}$-1 foot long, glabrous. Leaves glabrous except the scantily hairy mouth of the sheath, or more or less hairy, all crowded at the base, except the uppermost, which is reduced to a very long almost bladeless sheath ; basal sheaths firm, persistent, at length breaking up into fibres ; ligules very short, truncate. Blades filiform, setaceously convolute, up to 2-6 inches long, rather firm, flexuous, smooth.

RACEMES 2-3, slender, erect, 1-2 inches long ; rhachis very slender, angular, smooth, internodes $1\frac{1}{2}$-2 lines long, pedicels 2-nate, one very short, the other up to $1\frac{1}{4}$ line long, angular, scantily scabrid above.

SPIKELETS oblong, obtuse, $1\frac{1}{2}$ line long, greenish. Glumes, *lower* minute, rotundate, delicately hyaline ; *upper* oblong, subacute, $1\frac{1}{4}$ line long, 3-nerved, with lines of adpressed or slightly spreading, rufous capitellate hairs between the nerves, and along the margins, upper marginal hairs exceeding the glume. Valves, *lower* 7-9-nerved, nerves prominent, except the submarginal hairs similar to those of the upper glume, in 4 dorsal and 2 dense marginal lines ; *upper* subchartaceous, oblong, subacuminate, chestnut brown, except the hyaline whitish margin. Anthers $\frac{1}{2}$ line long.

Habitat :—NATAL. Hillside, near Mooi River, 4-5000 feet alt., *Mason* 6.

Drawn from Mason's specimen, the only one in the Herbarium.

Also in Tembuland, which is the only South African locality given for it in the Flora Capensis.

Fig. 1, Ligule ; 2, rhachis with pedicels ; 3, upper glume ; 4, lower valve ; 5, upper valve,front view ; 6, same, back view; 7, pale, front view ; 8, same, back view ; 9, ovary, styles, stigmas, stamens and lodicules ; 10, capitellate hair. *All enlarged.*

Digitaria setifolia, *Stapf.*

Digitaria horizontalis, *Willd.*

PLATE 140.

DIGITARIA HORIZONTALIS (Willd. Enum. Pl. Hort. Berol. 1809. 92). Fl. Cap. Vol. VII. p. 378.

ANNUAL.—CULMS ascending from a geniculate or more or less prostrate, sometimes rooting branched base, slender, 1-several feet long, glabrous, few to many noded, upper internode by far the longest.

LEAVES glabrous or hairy; sheaths thin, the lower withering; ligules very short. Blades linear-lanceolate to linear, acute or gradually tapering from below the middle, 2-5 inches long by 2-4 lines wide (in the South African specimens), flat, flaccid, margins scabrid.

RACEMES, 4 to many, subdigitate, or on an angular common axis of variable length (one to several inches long), singly or the lower subverticillate, erect or spreading, slender, strict, $1\frac{1}{2}$-6 inches long, usually villous or bearded at the base, often with a few scattered, stiff, long, very fine hairs from the common axis; rhachis very narrow, usually wavy, triquetrous, lateral angles more or less winged, scabrid, internodes about $1\frac{1}{2}$ line long (in the South African specimens), or longer. Pedicels 2-nate, one very short, the other up to $\frac{3}{4}$ line long, triquetrous, scabrid.

SPIKELETS linear-oblong, acute, $\frac{3}{4}$-1 line long, greenish. Glumes, *lower* extremely minute or supressed; *upper* lanceolate-oblong, equalling $\frac{1}{2}$-$\frac{3}{5}$ of the upper valve, 3-nerved, with lines of extremely fine adpressed silky hairs between the nerves and along the margin, or with the marginal hairs spreading. Valves equal or subequal; *lower* prominently and closely 7-nerved, with lines of extremely fine adpressed silky hairs between the outer nerves and along the margins, or with the marginal hairs spreading; *upper* subchartaceous, acute, pale-greenish.

Habitat:—NATAL. Near Durban, *Drège*; *Williamson* 27; Umpumulo *Buchanan*, 202; 204.

Drawn from Buchanan's No. 204, the specimen being in bad condition, and neither stamens nor stigmas being present.

Fig. 1, Ligule; 2, rhachis with 2-nate pedicels; 3, upper glume; 4, lower valve; 5, upper valve, front view; 6, same, back view; 7, pale. *All enlarged.*

PLATE 141.

DIGITARIA SANGUINALIS (Scop. Fl. Carn. ed. II.; 52.) Fl. Cap. Vol. VII. p. 378.

ANNUAL.—CULMS ascending from a geniculate or prostrate, often rooting, branched base, 1 to several feet long, glabrous, few to many noded, upper node by far the longest. Leaves glabrous or hairy; sheaths thin, herbaceous, loose, sometimes bearded at the nodes; ligules truncate, up to more than 1 line long. Blades linear-lanceolate to linear, acute, 1-5 inches long by 2-4 lines wide, flat, flaccid, margins scabrid.

RACEMES few to many, subdigitate, solitary or 2-3-nate on a short angular scaberulous common axis, erect or spreading, rather stout for the genus, usually strict, 1-6 inches long, often finely villous at the base; rhachis triquetrous, lateral angles winged, scabrid, internodes over 1 line long; pedicels 2-nate, one very short, the other up to $\frac{3}{4}$ line long, triquetrous, scabrid.

SPIKELETS oblong, acute, 1-1$\frac{1}{4}$ line long, greenish or purplish. Glumes, *lower* ovate, acute, about $\frac{1}{6}$ line long; *upper* ovate-lanceolate, acute, equalling $\frac{1}{2}$ or less of the upper valve, 3-nerved, with lines of extremely fine adpressed silky hairs between the nerves and along the margins. Valves, *lower* oblong-acute, 7-nerved, the inner lateral nerves somewhat distant from the middle nerve, very prominent, the outermost submarginal, faint lines of very fine adpressed silky hairs along the margins and often also between the lateral nerves; *upper* subchartaceous, oblong, subacuminate or acute, greenish or purplish, slightly shorter than the lower valve. Anthers up to $\frac{1}{2}$ line long.

Habitat:—NATAL. Near Durban, *Williamson*, 10; Berea, 100 feet alt., *Wood* 5998.

Drawn from Wood's specimen, which is the only one in the Government Herbarium.

Fig. 1, Ligule; 2, rhachis with 2-nate pedicels; 3, upper glume; 4, lower valve, back view; 5, upper valve, front view; 6, same, back view; 7, pale, front view; 8, same, back view; 9, ovary, styles, stigmas, stamens and lodicules. *All enlarged.*

Digitaria sanguinalis, *Scop*

Digitaria diversinervis, *Stapf.*

PLATE 142.

Digitaria diversinervis (Stapf Fl. Cap. Vol. VII. p. 379.)

Perennial (?).—Culms ascending from a prostrate, rooting, loosely branched base, very slender, weak, up to $1\frac{1}{2}$ foot long, glabrous, 4-6 noded; uppermost internode by far the longest, long exserted. Leaves glabrous or very sparingly hairy; sheaths thin, the lower withering; ligules very short. Blades linear-lanceolate, acute, 1-3 inches by $1\frac{1}{2}$-$2\frac{1}{2}$ lines, flat, flaccid, scaberulous in the upper part, margins scabrid.

Racemes subdigitate, slender, erect or spreading, $1\frac{1}{4}$-2 inches long, minutely villous at the insertion. Rhachis very narrow and wavy, triquetrous, angles scabrid, internodes up to 2 lines long. Pedicels 2-nate, one very short, the other up to 1 line long, triquetrous, scaberulous.

Spikelets oblong, acute, $1\frac{1}{2}$ line long, greenish, glabrous. Glumes thin, *lower* broadly ovate, up to $\frac{3}{8}$ line long, 1-nerved, or nerveless; *upper* ovate, acute, 1 line long, 1-sub-3-nerved. Valves equal, *lower* 7-9 nerved; upper subchartaceous, acuminate, pale to dark brown.

Habitat:—Natal. In woods near Durban, *Drège*; *Plant* 56; *McKen* 10; Durban Flat, *Buchanan*; without precise locality, *Gerrard*, 695; 589; Berea, 150 feet alt., *Wood* 5923.

Drawn from Wood's specimen,

Fig. 1, Ligule; 2, rhachis with 2-nate pedicels; 3, lower glume; 4, upper glume; 5, lower valve, back view; 6, same, front view; 7, upper valve, front view; 8, same, back view; 9, pale, front view; 10, same, back view; 11, ovary, styles, stigmas, stamens and lodicules. *All enlarged.*

PLATE 143.

DIGITARIA TENUIFLORA (Beauv. Agrost. 51). Fl. Cap. Vol. VII. p. 380.

ANNUAL OR SUB-PERENNIAL.—CULMS fascicled, very slender, prostrate and rooting, or ascending or sub-erect, $\frac{1}{2}$-$1\frac{1}{2}$ foot long, glabrous, many-noded, often branched. Sheaths rather lax, the lower more or less hairy, sometimes bearded at the nodes; ligules very short, membranous. Blades lanceolate to linear, acute, $\frac{1}{2}$-4 inches long, spreading, flat, glabrous, rarely hairy.

RACEMES usually 2-3, rarely more, very slender, 1-3 inches long, erect or spreading. Rhachis finely linear, margins scabrid. Pedicels 2-rarely 3-nate, unequal, tips discoid.

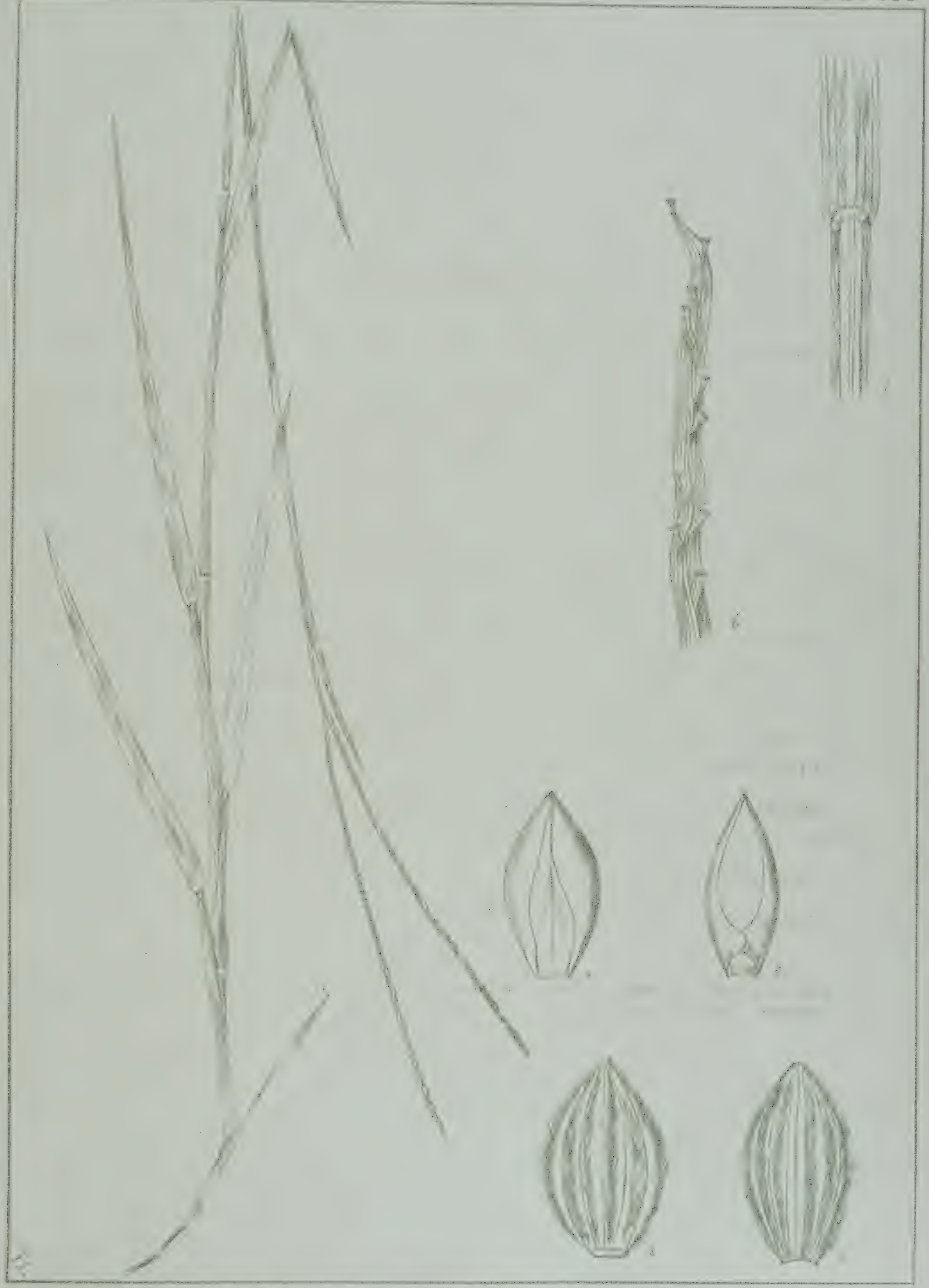
SPIKELETS adpressed to the rhachis, the superposed distant by rather less than their own length, elliptic-oblong. acute or subacute, $\frac{2}{3}$-$\frac{3}{4}$ line long, pale or purplish. Glumes, *lower* 0; *upper* 5-3-nerved, very finely and adpressedly silky with wrinkled hairs. Valves, *lower* similar and subequal to the upper glume, flat, 7-nerved; *upper* subchartaceous, ovate-oblong, slightly shorter than the lower, flaps of pale overlapping below. Anthers $\frac{1}{4}$ line long.

Habitat:—NATAL. Near Durban, *Drège*; Durban Flat, *Buchanan*, 35; near Umpumulo, *Buchanan*, 204a; and without precise locality, *Gerrard*, 588.

Drawn from Buchanan's 204a.

Through the tropics of the Old World.

Fig. 1, Ligule; 2, upper glume; 3, lower valve; 4, upper valve; 5, pale; 6, rhachis with pedicels. *All enlarged.*



Digitaria tenuifolia, *Beauv.*

Digitaria diagonalis, *Stapf.*

PLATE 144.

Digitaria diagonalis (Stapf, Fl. Cap. Vol. VII. p. 381).

Perennial.—Culms tufted on a short præmorse rhizome, erect, rather firm, simple, up to more than 3 feet long, glabrous or hairy below the racemes, 1-3-noded, the uppermost internode by far the longest. Leaves mainly crowded near the base; lower sheaths rather firm, strongly striate, adpressed hairy to tomentose at the base, persistent, at length breaking up into fibres, upper thinner, hairy or glabrous except the bearded nodes, uppermost very long, rather loose; ligules up to $1\frac{1}{2}$ line long, obtuse or truncate. Blades linear, tapering to a fine point, $\frac{1}{2}$-1 foot long, by 2-4 lines wide, flat or with involute margins, rigid or almost flaccid, scabrid, glabrous or softly hairy.

Racemes 5 to many, solitary or fascicled, on a scabrid or hirsute angular common rhachis of variable length (the whole inflorescence $\frac{1}{2}$-1 foot long), slender, strict or flexuous, erect or more or less spreading, 2-5 inches long, villous at the base. Rhachis subtriquetrous, wavy, very narrow, angular, angles rigidly ciliate, internodes up to $1\frac{1}{2}$ line long.

Spikelets in fascicles of 3-6, oblong, obtuse to subacute, 1-$1\frac{1}{4}$ line long; pedicels unequal, up to $1\frac{1}{2}$ line long, setulose, uppermost hairs equalling the spikelets. Glumes, *lower* 0; *upper* rotundate-ovate, obtuse, $\frac{1}{3}$-$\frac{1}{2}$ line long, hyaline, nerveless or 1-nerved. Valves equal, *lower* membranous, whitish, oblong, glabrous, 3-nerved; *upper* chartaceous like the pale, brown to almost black, somewhat shining. Anthers $\frac{1}{2}$ line long.

Habitat:—Natal. Near Durban, *Drège*; very common near Mapumulo, *Buchanan* 206; hill tops near Riet Vlei, 6000 feet alt., *Buchanan* 207; without precise locality, *Buchanan* 72; near Maritzburg, *St. George* 34; Zululand, *Jenkinson* 83.

Drawn from St. George's specimen.

Fig. 1, Rhachis with pedicels; 2, upper glume; 3, lower valve; 4, upper valve; 5, pale; 6, ovary, styles, stigmas, and lodicules. *All enlarged.*

PLATE 145.

DIGITARIA TRICHOLAENOIDES (Stapf, Fl. Cap. Vol. VII. p. 381).

PERENNIAL.—Rhizome short, oblique, densely covered by the persistent imbricate bases of the old sheaths. Culms erect, simple, 1-1½ foot long, glabrous.

LEAVES about 4 at the base, one from the only suprabasal node, reduced to a long almost bladeless sheath. Sheaths hairy, the uppermost narrow, silky bearded at the node, the lower widened. Ligules short, truncate. Blades linear to linear-lanceolate, tapering to an acute point, 2-3½ inches long, by 2-3 lines wide, flat, firm, glaucous, glabrous or hairy.

RACEMES 3-6, subdigitate, erect, strict or slightly nodding, densely silky often purplish, 2½-3 inches long, compound below. Racemes triquetrous, narrowly winged, scabrid, internodes 1½-3 lines long.

SPIKELETS 2-5-nate, or in the lowest fascicle with the central 2-3 on a very short branchlet, oblong, acute, 2-2½ lines long (exclusive of the hairs), densely silky, unequally pedicelled, longer pedicels up to 3 lines long, filiform, flexuous, glabrous, tips subdiscoid. Glumes, *lower* delicately hyaline, whitish, truncate or rotundate, up to ½ line long; *upper* oblong, acute to obtuse, ½-1¾ line long, 3-nerved, densely villous with long, soft, acute hairs, upper margins broadly and very delicately hyaline. Valves, *lower* oblong, acuminate, 7-nerved, glabrous along the middle, otherwise densely villous with soft, very long hairs (up to 2 lines); *upper* chartaceous, oblong, acutely acuminate, 2 lines long. Anthers over 1 line long.

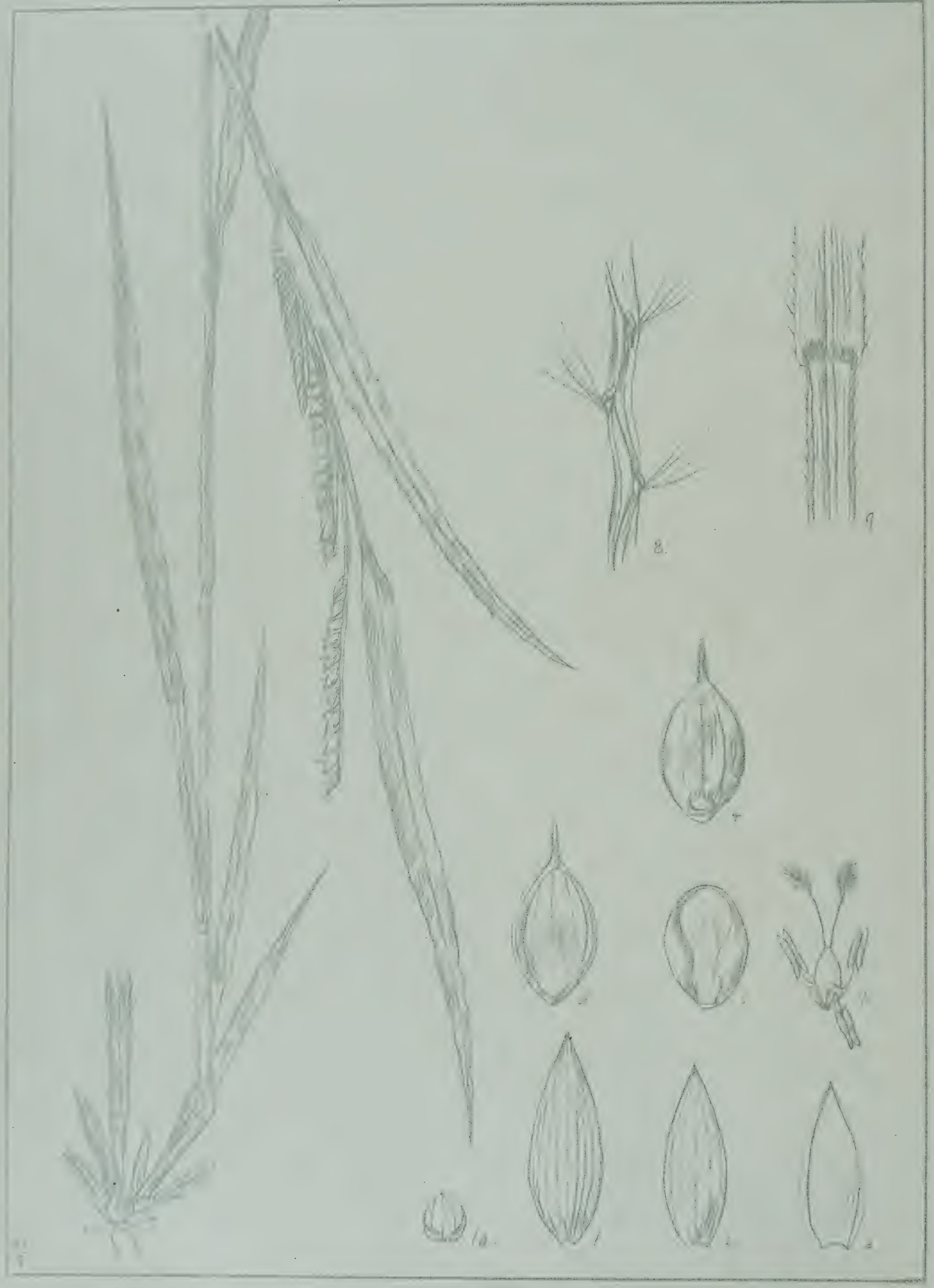
Habitat:—NATAL. Umsinga and base of Biggarsberg, *Buchanan*, 87; Mooi River, 4-5000 feet alt., *Mason* 21.

Drawn from Mason's specimen, the only one in the Government Herbarium.

This grass is in appearance very like a *Tricholaena*, with which genus it has no doubt often been confused by collectors. I have no information as to its value as a pasture grass.

Fig. 1, Lower glume; 2, upper glume; 3, lower valve; 4, upper valve, front view; 5, same, back view; 6 pale, front view; 7 same, back view; 8, pistil, stamens and lodicules. *All enlarged.*

Digitaria Nicholaenoides, *Stapf.*



anicum Helopus, *Trin,* var glabrescens, *K. Schum.*

PANICUM.

Mature spikelets falling entire from their pedicels, loosely panicled, solitary 2-nate or fascicled on the rhachis of the spike-like branches (false spikes) of a panicle. Upper floret perfect. Lodicules 2, broadly cuneate. Stamens 3. Styles distinct; stigmas laterally exserted below the tip of the floret. Grain tightly enclosed by the hardened valve and pale, oblong or ellipsoid; hilum basal, punctiform or orbicular; embryo equalling about half of the grain.

A large genus, including 200 to 250 species, many of which are valuable fodder grasses.

PLATE 146.

PANICUM HELOPUS (Trin. in Spreng. Neu. Entdeck, II, 84) var, glabrescens (K. Schum. in Engl. Pfl. Ost-Afr. C. 101). Fl. Cap. Vol. VII. p. 392.

ANNUAL.—CULMS suberect or ascending from a geniculate sometimes decumbent and rooting base, 1-2 feet long, glabrous, striate, 4-to-many-noded, branched or simple except at the base.

LEAVES more or less finely hirsute with tubercle-based hairs, rarely glabrescent or glabrous; sheaths rather lax, pubescent to villous at the nodes, ciliate above. Ligules very short, membranous, fimbriate. Blades linear-lanceolate to lanceolate from a broad-rounded or cordate base, acute to acuminate, 2-4 inches long by 3-8 lines wide, flat, flaccid, margins often wavy, scabrid or fimbriate.

FALSE SPIKES 3-12, rather distant on a compressed or angular, scabrid or often pubescent, common axis, suberect or spreading, secund, 2-ranked. Rhachis linear, $\frac{1}{4}$-$\frac{1}{2}$ line broad, flat on the back, with a very prominent midrib on the face, scabrid or spinulously ciliate, and often with scattered, fine, long, tubercle-based bristles as well. Pedicels usually solitary, very short, stout, scabrid, pubescent, with or without 2-3 bristles near the thickened tips.

SPIKELETS contiguous or subimbricate, ovate to ovate-oblong, acute, 2-2$\frac{1}{2}$ lines long, pallid, glabrous. Glumes, *lower* turned away from the rhachis, broadly ovate, clasping, obtuse, equalling $\frac{1}{4}$-$\frac{1}{3}$ of the spikelet, hyaline, 3-5-nerved; *upper* membranous, ovate to ovate-oblong, subacute to subacuminate, prominently 7-9-nerved. *Lower floret* male or barren. Valve ovate, acuminate, 5-7-nerved, pale equal, subacute. *Perfect floret* elliptic, rounded at both ends, 1$\frac{1}{2}$ line long, pallid. Valve with a scabrid mucro, up to $\frac{1}{2}$ line long, tranversely wrinkled, 5-nerved. Anthers scarcely $\frac{1}{2}$ line long. Grain elliptic, dorsally compressed. Embryo $\frac{3}{4}$ the length of the grain.

Habitat:—NATAL. Without precise locality *Buchanan*, 78; near Maritzburg *St. George* 17 (*Wood* 7240).

Drawn from St. George's specimen, the only one in the Government Herbarium.

Also in Cape Colony and Orange Free State, Mascarene Islands, East Africa, Abyssinia, and India. The typical form with densely pubescent spikelets has not been found on the African Continent.

Fig. 1, Lower glume; 1a, upper glume. *Male floret*—2, lower valve; 3, pale. *Perfect floret*—4, upper valve, back view; 5, same, front view; 6, pale; 7, stamens, pistil and lodicules; 8, rhachis with pedicels; 9, ligule. *All enlarged.*

PLATE 147.

PANICUM BRIZANTHUM (Hochst. in Flora, 1841, Intell. 1.19 (name only) and ex A Rich. Tent. Fl. Abyss. 11,363.) (Fl. Cap. Vol. VII. p. 386).

PERENNIAL.—CULMS erect or geniculately ascending from a short rhizome, stout in tall specimens, $1\frac{1}{2}$-6 feet long, glabrous or hirsute with tubercle-based hairs, 4-6 or sometimes many-noded, upper internodes exserted.

LEAVES glabrous or hirsute with fine tubercle-based hairs; sheaths rather tight, terete, striate; ligule a narrow fimbriate rim; blades linear to sublanceolate, acute to acuminate, 2-15 inches long, by 3-8 lines wide, usually flat, firm, light green, margins cartilaginous, spinulous.

FALSE SPIKES, solitary or more usually 2-8 on a slender triquetrous scabrid or rarely almost smooth and often hairy, common axis, distant, often curved, and more or less spreading, rather stout, 2-6 inches long: rhachis slender, linear, dorsally keeled, scabrid and more or less fringed with tubercle-based hairs, villous at the base, internodes $1\frac{1}{2}$-2 lines long; pedicels solitary, alternate from near the edges, very short, stout.

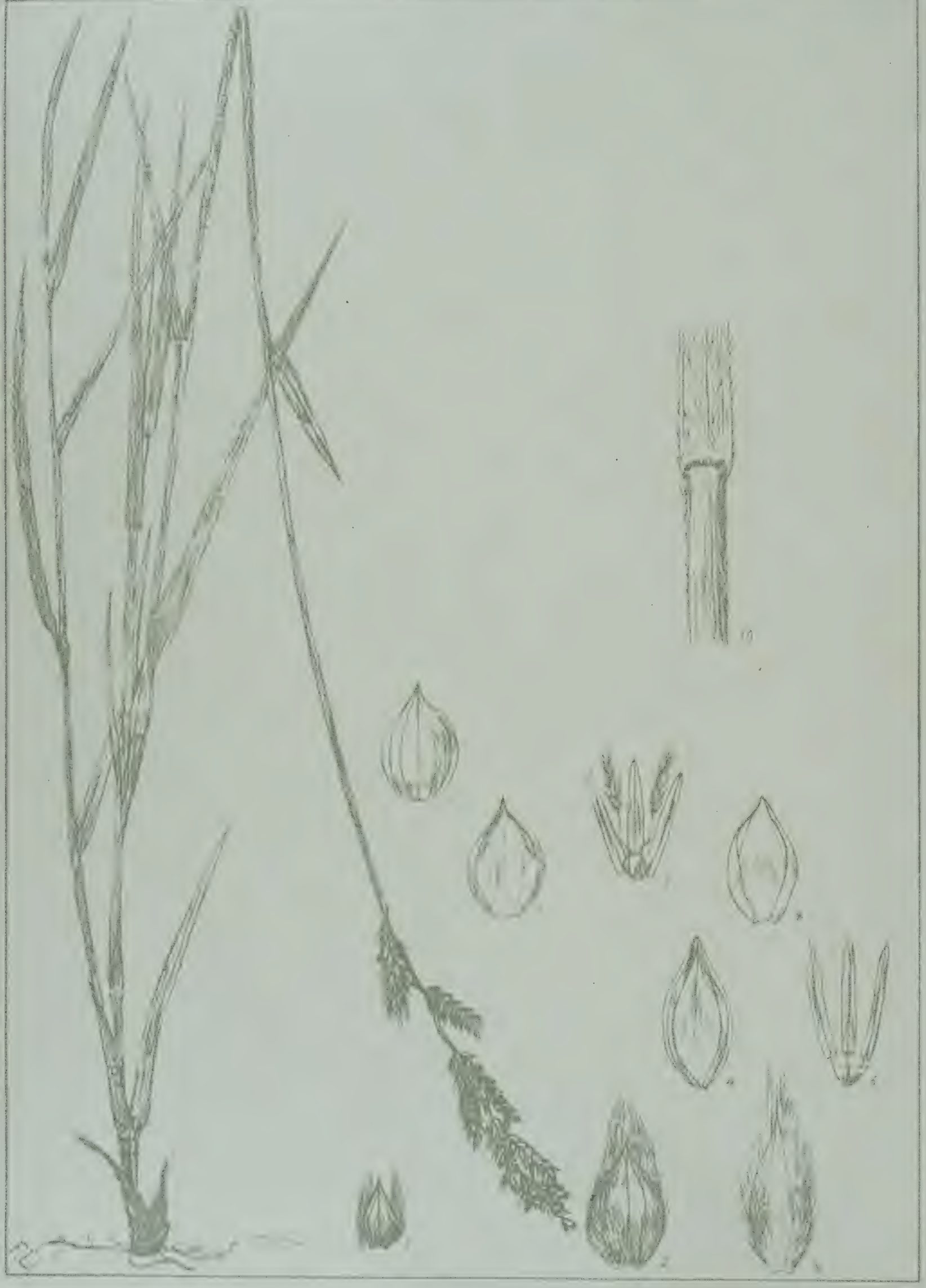
SPIKELETS usually 1-ranked, contiguous, ellipsoid, obtuse, turgid, about $2\frac{1}{2}$ lines long, pallid, with purple tips, glabrous. Glumes, *lower* membranaceous, very broad, clasping, obtuse, 1-$1\frac{1}{4}$ line long, 7-11 nerved, often purple; *upper* firmly membranaceous, oblong, very concave, 2-$2\frac{1}{2}$ lines long, 7-9 nerved, nerves anastomosing above. *Lower floret* male, valve similar to the upper glume, 5-nerved; pale broad, elliptic, obtuse, 2-keeled; anthers $1\frac{1}{2}$ line long. *Perfect floret* equalling the upper glume, oblong; valve crustaceous with an obscure callous tip, very finely pitted, 5-nerved, whitish; flaps of pale very broad above the base.

Habitat:—NATAL.—Near Umpumulo, *Buchanan* 183; Inanda, *Wood* 1579; Fenton Vacy, *Wood*, 1577.

Also in Tropical Africa.

Fig. 1, Lowest glume; 2, upper glume; 3, lower valve; 4, pale; 5, stamens and lodicules; 6, upper valve; 7, pale; 8, stamens, ovary, style, stigmas and lodicules. *All enlarged.*

Panicum brizanthum, *Hochst.*



Panicum serratum, *Spreng.*

PLATE 148.

PANICUM SERRATUM (Spreng. Syst. 1, 309). (Fl. Cap. Vol. VII. p. 388).

PERENNIAL.—Rhizome short, thick, tomentose, with equally tomentose innovation buds.

CULMS erect or geniculately ascending, simple or often much branched above the base, slender, $1\frac{1}{2}$-2 feet long, terete, pubescent above.

LEAVES often crowded, dichotomously imbricate towards the base; sheaths tight, terete, the lowest tomentose, sometimes glabrescent, the following gradually less hairy glabrescent or glabrous, except the pubescent or villous margins and nodes; ligule a fringe of short rigid hairs; blades linear to linear-lanceolate with a callous point, 1-4 inches long, by $1\frac{1}{2}$-$2\frac{1}{2}$ lines wide, rigid, flat or involute, glabrous or hairy, particularly near the base, margins cartilaginous, wavy, spinulous.

FALSE SPIKES 4-10, secund on a filiform, angular, glabrous or puberulous common axis, erect or spreading, usually longer than the internodes, gradually decreasing upwards, dense, 12-3 lines long, rhachis filiform, angular, very wavy, rigidly pubescent to sub-hirsute; pedicels solitary or the lowest 2-nate, filiform with discoid tips, curved, the lower very short, the upper up to 1 line long, hairy.

SPIKELETS usually 2-ranked, contiguous or subcontiguous, obovoid-ellipsoid, obtuse, turgid, $1\frac{1}{4}$-$1\frac{1}{2}$ line long, pallid, overtopped by a purplish tuft of silky hairs. Glumes, *lower* facing the rhachis, subhyaline, broadly ovate to rotundate-ovate, obtuse, $\frac{3}{4}$-1 line long, often purplish, 3-nerved, hairy; *upper* membranous, broadly elliptic, acute or subcuspidate, $1\frac{1}{4}$-$1\frac{1}{2}$ line long, very concave, faintly 5-nerved, minutely villous or glabrescent in the centre, with a transverse fringe of purplish hairs below the glabrous tip. *Lower floret* male, valve equal and similar to the upper glume, but more distinctly cuspidate, hyaline and glabrous along the middle nerve, transverse fringe broken up into 2 broad tufts; pale broad, almost equalling the valve; anthers over 1 line long. *Perfect floret* elliptic, cuspidate or mucronulate, 1-$1\frac{1}{4}$ line long, valve elliptic, coriaceous, pallid, glabrous or ciliate near the tip, finely pitted.

Habitat:—NATAL.—Umpumulo 2,400 feet alt., *Buchanan* 213; Umsinga and base of Biggarsberg, *Buchanan*, 105; Riet Vlei 4-5000 feet alt., *Buchanan* 214.

Fig. 1, Lowest glume; 2, upper glume. *Male floret.*—3, lower valve; 4, pale; 5, stamens and lodicules. *Perfect floret.*—6, upper valve, front view; 7, same, back view; 8, pale; 9, stamens, style, ovary, stigma and lodicules; 10, ligule. *All enlarged.*

PLATE 149.

PANICUM ISACHNE (Roth. ex Roem et Schult, 99,458). (Fl. Cap. Vol. VII. p. 390).

ANNUAL.—Culms geniculately ascending from a sometimes decumbent and rooting base, very slender, 1-2 feet long, terete or angular, glabrous, 3 to many-noded much branched below, simple above. Sheaths rather tight, terete or subterete, strongly striate, softly hairy or glabrous, except at the minutely villous nodes, the upper shorter than the internodes. Ligule a dense fringe of stiff hairs. Blades linear-lanceolate from a rounded base, acute, 1-2½ inches long, by 1-2½ lines wide, flat or involute, rather rigid, softly hairy or quite glabrous, margins very scabrid.

FALSE SPIKES 2-10, secund or subsecund, on an usually adpressed to a filiform scabrid axis; as long as, or longer than the internodes, very slender, ½-1 inch long. Rhachis filiform, wavy, triquetrous, scabrid, 1-3 inches long. Pedicels solitary, very short, stout, scabrid or bristly, tips thickened with hyaline margins.

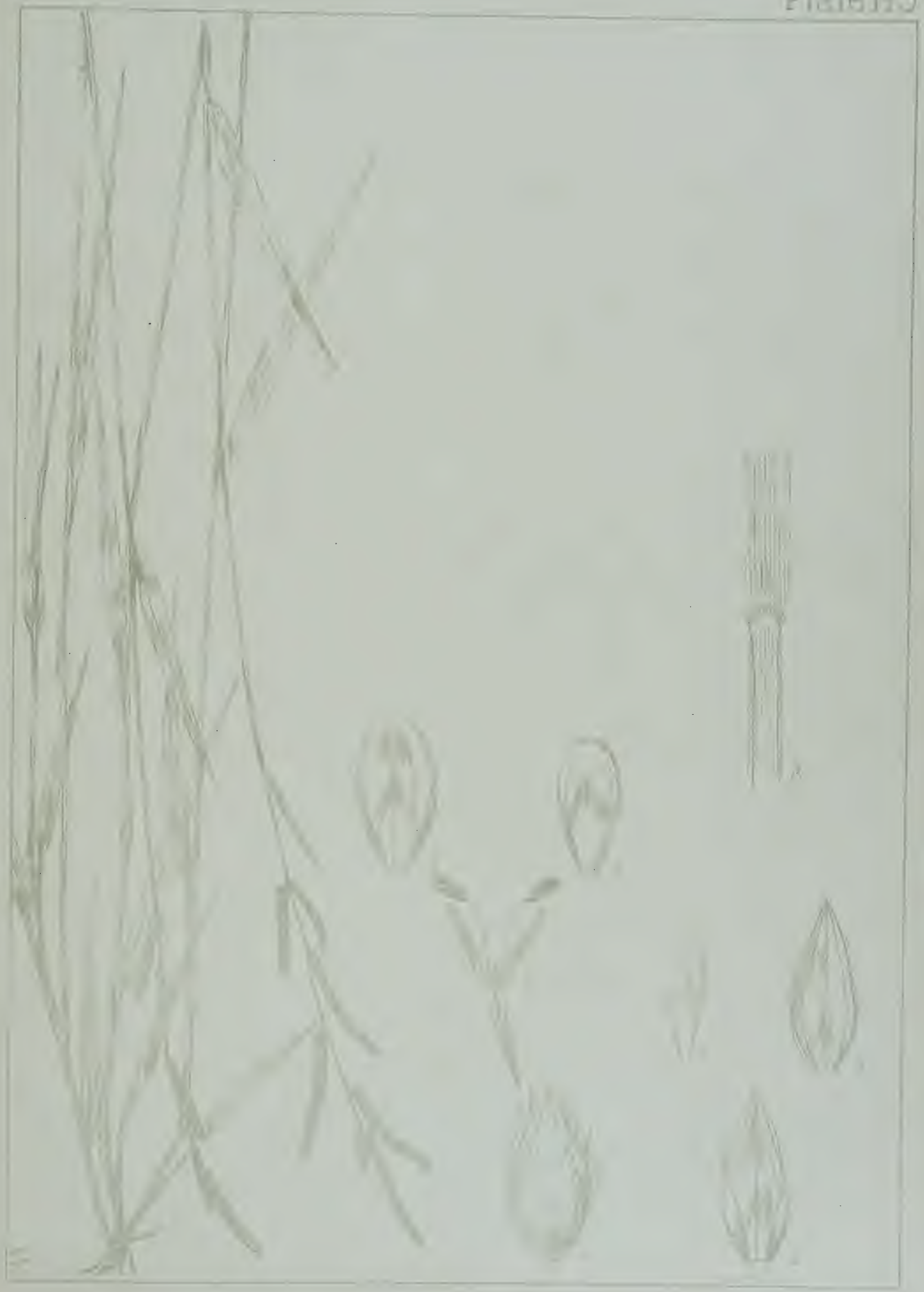
SPIKELETS 2-ranked, secund, contiguous, oblong, subacute or obtuse, about 1 line long, pallid with purplish tips, softly pubescent. Glumes, lower facing the rhachis, minute, nerveless, rarely ½ line long and 1-nerved; upper membranous, oblong, 5-nerved, minutely hairy. *Lower floret* usually barren, sometimes male. Valve like the upper glume but narrower, 5-3-nerved, pale very obtuse, subequal to the valve in male, shorter in barren florets. *Perfect floret* elliptic-oblong, rounded at both ends, $\frac{3}{1}\frac{1}{5}$ line long. Valve subcoriaceous, faintly 5-nerved, shining, whitish, finely granulate. Anthers ½ line long. Grain oblong-ellipsoid ½ line long, hilum orbicular, ½ length of the grain.

Habitat:—NATAL.—Riet Vlei 4,000 feet alt., *Buchanan* 215, 216.

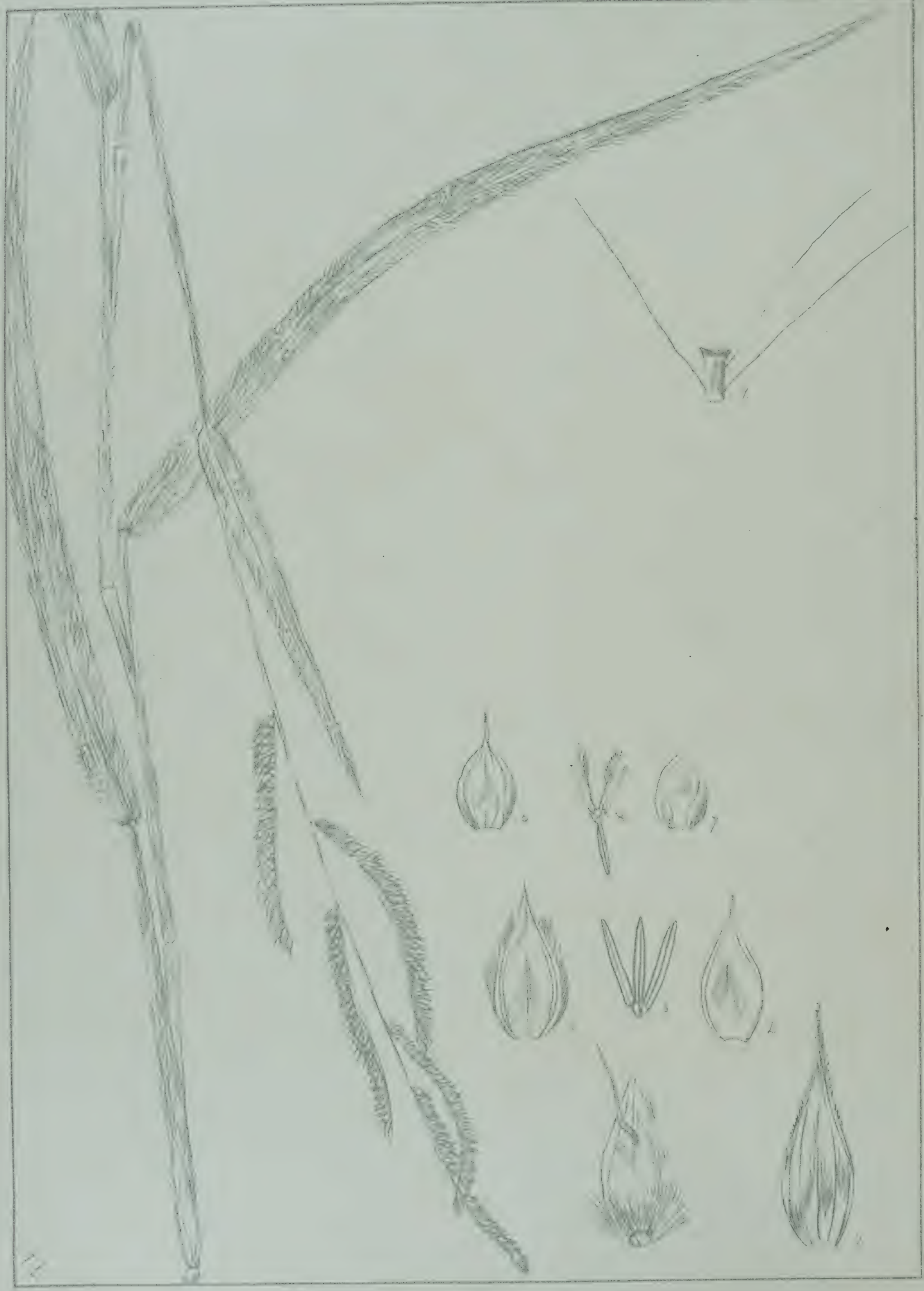
Also in Basutoland and Bechuanaland.

Drawn from Buchanan's specimens, the only ones in the Government Herbarium.

Fig. 1, Upper glume. *Lower floret.*—2, lower valve, front view; 3, same, back view; 4, pale. *Perfect floret.*—5, upper valve; 6, pale; 7, stamens, pistil and lodicules; 8, ligule. *All enlarged.*



Panicum Isachne, *Roth.*



Panicum trichopus, *Hochst.*

PLATE 150.

PANICUM TRICHOPUS (Hochst. in Flora, 1844,254). (Fl. Cap. Vol. VII. p. 391).

PERENNIAL?—Culms ascending from a decumbent geniculate base, 1-2 feet long, slender, glabrous or pubescent, 4-to many-noded, simple or scantily branched above the base. Leaves finely hirsute with tubercle-based hairs, rarely glabrescent; sheaths rather lax, bearded at the nodes, ciliate along the outer margin: ligules membranous, very short, fimbriate. Blades linear to linear-lanceolate from a broad rounded or sub-cordate base, acute to acuminate, 2-4 inches long, by 2-6 lines wide, flat, flaccid, margins often wavy, scabrid, or fimbriate.

FALSE SPIKES 3-12, rather distant on a compressed or angular pubescent, sometimes bristly, common axis, sub-erect or spreading, secund, 2-4-ranked, 1-1½ inch long; rhachis linear, ½-¾ line broad, flat on the back, with a very prominent midrib on the face, scabrid or spinulously ciliate, and often with long tubercle-based bristles as well, villous at the base; pedicels solitary or 2-nate, and then unequal, very short, stout, scabrid, pubescent, with 1-3 bristles near the thickened tips.

SPIKELETS contiguous or imbricate, elliptic-ovate, acutely acuminate, 2 lines long, pale. Glumes, *lower* turned away from the rhachis, elliptic, obtuse, equalling ¾ of the spikelet, subhyaline, 3-nerved with 1-3 bristles from a central tubercle; *upper* membranous, elliptic-ovate, acutely acuminate, 2 lines long, 5-nerved, scantily pubescent, sometimes with a few rigid cilia on one side. *Lower floret* male. Valve like the upper glume, 3-5-nerved, rigidly and appressedly ciliate on one or on both sides; pale equal; acuminate. Anthers ½-¾ line long. *Perfect florets* broadly elliptic, rounded, 1-1¼ line long, whitish. Valve with a scabrid mucro up to ⅓ line long, 5-nerved, finely and transversely rugose. Anthers ¾ line long.

Habitat:—NATAL. Umpumulo, 1,000 feet alt., *Buchanan* 218.

Also in Tropical Africa.

Fig. 1, Lower glume; 2, upper glume. *Lower floret.*—3, lower valve; 4, pale; 5, stamens and lodicules. *Perfect floret.*—6, lower glume; 7, pale; 8, stamens, style, stigma, ovary and lodicules; 9, pedicel. *All enlarged.*

NATAL PLANTS.

VOL. 2.—PART 3.

GRASSES.

. . . EDITED BY . . .

J. MEDLEY WOOD, A.L.S.

CURATOR OF NATAL BOTANIC GARDENS, DURBAN,

—— AND OF ——

NATAL GOVERNMENT HERBARIUM.

Title Page, Preface and Index will be published with the concluding part of the Volume.

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1903

PANICUM CRUS-PAVONIS. *NEES.*

Var: rostratum Stapf.

PLATE 151.

PANICUM CRUS-PAVONIS, Nees var. rostratum, Stapf. (Fl. Cap. Vol 7. P. 396.)

Nat. Order Gramineæ.

PERENNIAL.—Culms erect, stout, terete, up to 5 feet long, and to 3 lines thick below, glabrous, smooth, about 5-noded, sheathed all along or the internodes at length more or less exserted.

Leaves quite glabrous, sheaths terete, striate, smooth; ligules none, junction of sheath and blade quite glabrous inside or scantily and very minutely pubescent.

Blades lanceolate-linear from a slightly narrowed base, which is usually long decurrent in the upper leaves, tapering to a very fine point, 3 to 10 inches by 5 to 9 lines, flat, rather firm, smooth above, scaberulous below, at least in the upper part, margins cartilaginous, scabrid to spinulous, midrib broad, white.

Panicle erect, linear-oblong, 4 to 10 inches long, dense; axis rather stout, triquetrous, very scabrid; branches solitary or 2-nate, distant below, close above, the lower $1\frac{1}{2}$ to $4\frac{1}{2}$ inches long, forming sessile, stout, very dense, simple or compound, subsecund false spikes; rhachis usually beset with tubercle-based bristles; pedicels 2-nate or fascicled on very short branchlets, very short, up to $\frac{1}{2}$ line long, scabrid, tips obscurely discoid.

Spikelets in compact clusters, elliptic-oblong, caudate-acuminate, $1\frac{1}{4}$ to $1\frac{1}{2}$ line long, light green or tinged with purple. Glumes, *lower* very broadly ovate, acute to subacuminate, clasping at the base, $\frac{1}{2}$ to $\frac{2}{3}$ line long, 3 to 5-nerved, scaberulous, upper herbaceous-membranous, broadly oblong, very concave, cuspidate-acuminate, equalling the spikelet, 5-nerved, rigidly pubescent between the scabrid or spinulous nerves. Florets: *lower* barren; valve similar to the upper glume, but flat or depressed on the back, tips rostrate, laterally compressed, up to $\frac{1}{2}$ line long; pale oblong, keels scaberulous above. Perfect floret ovate-oblong, subacuminate or cuspidate, up to $1\frac{1}{2}$ line long, greenish yellow, smooth; valve crustaceous, 5-nerved. Anthers linear, $\frac{1}{2}$ line long. Grain obovate-oblong, very broad, $\frac{3}{4}$ line long.

Habitat: NATAL. On sand-flats near the mouth of Umzimkulu River, *Drège;* Durban Flats, *Buchanan*, 4; Umhlali, *Wood*, 3992; and without precise locality *Gerrard* 496; *Buchanan* 269.

This grass is very closely related to *Panicum crus-galli*, L, the "Barnyard or Cockshin Grass" and has been by some writers considered to be only a variety of it. *P. crus-galli* has also been found in Natal, but no specimens of it are in the Government Herbarium. As the difference between these two grasses are botanical only, it is quite probable that what is said of *P. crus-galli* as an agricultural grass will also apply to *P. crus-pavonis.* Baron F. v Mueller says of it that it is a rich but annual grass, and that it does well along river banks and near stagnant water, and it was in such a locality that *Wood's* No. 3992 was collected. He also says that it will succeed in somewhat saline soil, particularly near brackish water-courses: also that on the Lower Mississippi it has furnished as much as four or even five tons of hay from an acre, and that cows and horses are very fond of it whether fresh or dry. Another writer on English grasses says "that it is of no agricultural value." It is, however, well known to farmers, by its popular name.

Fig 1, Portion of rhachis with pedicels; 2, lower glume; 3, upper glume; 4, lower valve; 5, pale; 6, upper valve; 7, pale enclosing ovary, style and stigmas; 8, ovary, style stigmas, stamens and lodicules. *All enlarged.*

PLATE 152.

PANICUM ÆQUINERVE, NEES. (Fl. Cap. Vol. VII., p. 399).

Nat. Order Gramineæ.

PERENNIAL.—Culms suberect or ascending, very slender, 1 to 1½ foot long, laxly branched, many noded, glabrous, internodes usually exserted.

LEAVES glabrous or hairy; sheaths thin, tight, striate; ligule an obscure minutely ciliate rim; blades linear to lanceolate-linear from a suddenly contracted, often subauricled base, tapering to a fine point, 1 to 2 inches by 1½ to 2 lines, flat, thin, smooth, margins scabrid.

PANICLE scanty, lax, erect, 2 to 4 inches long, axis filiform, smooth; branches very few, 2-nate or solitary, distant, at length spreading, the longer 1½ to 3½ inches long, simple or almost so, 5 to 2-spiculate, finely filiform to capillary, flexuous, smooth, pedicels ½ to 1 line long, tips subcupular.

SPIKELETS oblong, acute to subacuminate, about 1½ line long, greenish, glabrous or pubescent, prominently nerved. Glumes, *lower* oblong, subobtuse, very slightly shorter than the upper, 5-nerved, margins and tip hyaline; *upper* glume similar, broader, subacuminate, 7-nerved. Lower floret barren. Valve equal to and like the upper glume, but 5-nerved. Pale half the length of the valve. Perfect floret oblong, acute or subacuminate, 1 to 1¼ line long, yellowish. Valve subcoriaceous, 5-nerved, smooth. Anthers over ½ line long.

Habitat: NATAL. Swampy places below 1000 feet alt., *Drège;* near Umpumulo 2000 to 2500 feet alt., *Buchanan* 260.

Drawn from Buchanan's No. 260, the only specimen in the Colonial Herbarium.

We have no information as to the value of this species, nor can we ascertain whether the natives have a distinctive name for it or not. The specimen from which it was drawn was very incomplete, neither stamens nor stigmas could be found.

Fig 1, Lower glume; 2, upper glume; 3, lower valve; 4, pale; 5, upper valve; 6, pale; 7, mature ovary; 8, lodicule; 9, pedicels and spikelets; 10, portion of sheath, and blade of leaf with ligule. *All enlarged.*

PANICUM ÆQUINERVE. *NEES.*

PANICUM LATICOMUM. *NEES.*

PLATE 153.

PANICUM LATICOMUM, NEES. (Fl. Cap. Vol. 7, page 401).

Nat. Order Gramineæ.

PERENNIAL.—Culms ascending, divided above the base into somewhat spreading, long, leafy flowering branches, slender, 1½ to 2 feet long, minutely hairy or glabrous, many-noded, internodes exserted; sheaths tight, thin, striate, hairy, often with tubercle-based hairs or glabrescent except at the nodes and near the junction with the blade; ligule a minutely ciliolate rim. Blades spreading, lanceolate from a rounded base, acutely acuminate, 1½ by 3 inches, by ¼ to ½ inch, flat, very thin, sparingly and finely hairy, margins scabrid.

Panicle erect, very lax, delicately and divaricately branched, about ½ foot long; axis filiform, terete and smooth below, angular and finely scabrid above; branches in fascicles of 4-2 or solitary, unequal, at length spreading, finely filiform to capillary, very laxly divided, often from 1 to 2 inches above the base; branchlets and pedicels extremely fine, scaberulous, lateral pedicels 1 to 4 lines long, tips scarcely thickened.

Spikelets oblong, acute at both ends, slightly more than 1 line long, glabrous, green. Glumes, very thinly herbaceous; *lower* broadly ovate, subobtuse, ½ line long, 3-nerved; *upper* one somewhat remote from the lower, oblong, acute, almost 1 line long, 5-nerved, middle nerve scaberulous above. Florets, *lower* barren; valve like the upper glume, but slightly longer; pale ½ the length of the valve. Perfect floret oblong, obliquely apiculate or acute, equally or slightly exceeding the upper glume; valve subcoriaceous, whitish, faintly 5-nerved; anthers ½ line long; grain obovoid, ½ line long, white.

Habitat: NATAL: Shady woods near Durban, *Drège* 4289; coastland *Sutherland*; and without precise locality *Gerrard* 89; Berea, 150 feet alt., March, *Wood* 5936.

"The fruiting florets often separate from the remainder of the spikelet, which remains for a while attached to the pedicel, but falls at length as a whole. The habit is not unlike that of *Isachne albens, Trin.*"

Drawn from Wood's specimen, the only one in the Government Herbarium.

Fig 1, Portion of leaf with ligule; 2, pedicels and spikelets; 3, lower glume; 4, upper glume; 5, lower valve; 6, pale; 7, upper valve; 8, pale; 9, lodicules; 10, stamens, ovary, style and stigma. *All enlarged.*

PLATE 154.

PANICUM ZIZANIOIDES, H.B.K. (Fl. Cap. Vol. 7, page 402).

Nat. Order Gramineæ.

PERENNIAL.—Culms rather slender, firm, ascending from an often long prostrate and rooting base, up to 8 feet long, and to 2 to 4 feet high, glabrous, many-noded, more or less branched.

Leaves, sheaths rather tight or the lower loose and deciduous, striate, glabrous or finely hairy to hirsute in the upper part, margins ciliate; ligule a ciliate membranous rim; blades obliquely erect or spreading, ovate-lanceolate, to lanceolate, rarely linear, from a rounded auricled or cordate base, acuminate or gradually tapering to an acute point, 3 to 7 inches, by $\frac{1}{3}$ to 1 inch, flat, firm, glabrous, smooth or scantily dotted with small hairs on the upper surface, closely nerved and transversely veined near the base when broad, margins cartilaginous, scabrid to spinulous, often fimbriate at the base.

Panicle erect or slightly nodding, more or less contracted, lax, 4 to 8 inches long; axis slender, angular, glabrous or pubescent particularly at the nodes, angles smooth or scabrid; branches 4 to 8, rarely more, usually solitary, distant, suberect, 1 to 5 inches long, simple or shortly and sparingly branched from the base or near it, triangular, very slender to filiform, minutely tomentose at the base, internodes 2 to 8 lines long; lower pedicels 2-nate, unequal, upper solitary, the longer $1\frac{1}{2}$ to 6 lines long, triangular, scabrid.

Spikelets oblong-ellipsoid, 2 to 3 lines long, turgid, glabrous, smooth, light green, usually obscurely nerved. Glumes oblong, rather firm, subcarinate above, with callous, laterally compressed tips, *lower* shorter by $\frac{1}{3}$ or less, 3-nerved, *upper* equalling the spikelet, 5-nerved. Florets, *lower* male; valve very similar to the upper glume; pale equal, acute; perfect floret equalling the male, oblong; valve coriaceous, smooth, shining, straw-coloured or whitish, 5-nerved; pale subauriculate near the base; anthers 1 line long.

Habitat: NATAL. Without precise locality *Gerrard* 480. Berea 150 feet alt., March, *Wood* No. 5941.

Also in West Africa, India and tropical America.

Drawn from Wood's specimen, the only one in the Government Herbarium.

Fig 1, Portion of leaf with ligule; 2, lower glume, back view; 3, upper glume, back view; 4, lower valve, back view; 5, pale; 6, stamens and lodicules; 7, upper valve; 8, pale; 9, pistil, stamens and lodicules. *All enlarged.*

PANICUM ZIZANIOIDES. *H. B. K.*

PANICUM DEUSTUM. *THUNB.*

PLATE 155.

PANICUM DEUSTUM, THUNB. (Fl Cap. Vol. VII, p. 403).

Nat. Order Gramineæ.

PERENNIAL.—Culms from a very short rhizome or the tops of slender stolons, fascicled with few intravaginal innovation shoots, erect or geniculately ascending, 2 to 4 feet long, glabrous or finely pubescent below the nodes, sometimes hirsute towards the panicle, terete, 3 to 6-noded, subsimple or scantily branched, upper internodes more or less exserted. Leaves glabrous or sparingly (rarely densely) hirsute with tubercle-based hairs; sheaths rather firm, terete or subcompressed, striate, nodes pubescent; ligule a narrow membranous softly ciliate rim; blades linear to linear-lanceolate from a contracted and rounded or gradually attenuate base, long tapering to a very fine point, $\frac{1}{2}$ to $1\frac{1}{2}$ foot by 4 to 8 lines (rarely by 1 inch), flat, smooth except the scabrid margins, midrib rather stout, whitish.

PANICLE erect or nodding, contracted or lax, 3 to 9 inches long; axis slender, angular, scabrid with fine tubercle-based hairs, often pubescent or subhirsute below the nodes, branches scattered or subopposite or scantily whorled, suberect or spreading, rather distant, up to 4 inches long, simple, laxly racemose, with 2-nate spikelets, or divided almost from the base, filiform, flexuous or strict, angular, very scabrid, sometimes with scattered hairs. Pedicels usually 2-nate, unequal, the terminal sometimes up to 6 inches long, filiform, scabrid, glabrous or with few long hairs. Spikelets oblong, obtuse, turgid, 2 to $2\frac{1}{2}$ lines long, light green usually with purple or blackish tips, glabrous.

GLUMES, *lower* membranous, obtuse or subacute, 1 to $1\frac{1}{2}$ line long, 5 to 7-nerved, sometimes purple at the base; *upper* one firmly membranous, oblong, 2 to $2\frac{1}{2}$ lines long, 7-nerved.

FLORETS, *lower* male; valve ovate-oblong, obtuse, somewhat shorter than the upper glume; pale oblong, obtuse. Anthers $1\frac{1}{2}$ line long. Perfect floret exceeding the male and sometimes also the upper glume; narrowly oblong, obscurely and obtusely apiculate, yellowish, smooth, shining. Valve coriaceous, 5-nerved. Grain obovoid-elliptic, over 1 line long; hilum oblong, $\frac{1}{3}$ the length of the grain.

Habitat: NATAL. By streamlets near Umpumulo, *Buchanan* 265a; *Ubabi, Sutherland;* near Durban, *Williamson* 17, 18, and without precise locality *Gerrard* 483; *Cooper* 3342; *Buchanan* 265; Zululand, *Jenkinson* 97.

Drawn from Buchanan's 265 and 265a.

Mr. Jenkinson says of this grass: "Liked by cattle, only found in small patches." "This grass is very variable with respect to hairiness and the length of the pedicels."

Fig 1, Lower glume; 2, upper glume; 3, lower valve; 4, pale; 5, stamens and lodicules; 6, upper valve; 7, pale. *All enlarged.*

PLATE 156.

PANICUM MAXIMUM, JACQ. (Fl. Cap. Vol. VII., p. 404).

Nat. Order Gramineæ.

PERENNIAL.—(Sometimes flowering the first year). Tufted, innovation shoots intravaginal, rhizome short, sometimes very stout.

CULMS erect or geniculate, robust, usually tall, up to 10 feet long, compressed below, glabrous or the lower part more or less hirsute, usually 3 to 6-noded, sub simple or more or less branched, branches erect, upper internodes exserted.

LEAVES glabrous or softly hairy or coarsely hirsute with tubercle-base hairs; sheaths rather firm, the lower compressed, striate, nodes glabrous, pubescent or bearded; ligules membranous, very short, ciliate, and often with a dense beard behind; blades linear to lanceolate-linear from a contracted and rounded or attenuate base, long tapering to a fine (sometimes convolute and filiform) point, $\frac{1}{2}$ to 2 feet by 2 to 8 lines, rarely broader; flat, minutely tomentose at the junction with the blade, midrib rather stout, whitish.

PANICLE erect or nodding, contracted or effuse and lax, decompound, from $\frac{1}{2}$ to over 1 foot long, axis slender, angular, glabrous, smooth or scaberulous above; lower branches whorled, suberect or spreading, rather distant, up to 6 inches long, divided almost from the base, or undivided for 1 to $2\frac{1}{2}$ inches, filiform, scaberulous above, smooth below, glabrous except at the often minutely tomentose or pubescent callous base. Pedicels fascicled, 3-2-nate or the upper solitary, very unequal, very short to several times longer than the spikelet, capillary, flexuous, scabrid.

SPIKELETS oblong, subobtuse or obtuse, somewhat turgid, $1\frac{1}{4}$ to $1\frac{1}{2}$ line long, light green, sometimes tinged with purple, glabrous, rarely puberulous.

GLUMES, *lower* rounded, $\frac{1}{8}$ to $\frac{3}{8}$ line long, subhyaline, faintly 3-nerved to nerveless, *upper* oblong, acute or subobtuse, $1\frac{1}{4}$ to $1\frac{1}{2}$ line long, membranous, 5-nerved. Florets, *lower* male, valve very similar to and very slightly shorter than the upper glume; pale oblong, obtuse; perfect floret equalling the male or scarcely shorter, oblong, obtuse, valve 5-nerved, finely transversely rugose. Anthers $\frac{1}{2}$ to $\frac{3}{4}$ line long. Grain over $\frac{1}{2}$ line long.

Habitat: NATAL. Common between 2000 and 2500 feet, *Buchanan* 263; Umpumulo, 2000 to 2500 feet, *Buchanan* 264: Hills near the Umlazi River, *Krauss*, 183; Durban, *Drège; McKen* 100: *Buchanan* 30: by the Umzimkulu River, *Drège;* and between the Umkomanzi River and the Umlazi River, *Drège*; Delagoa Bay, *Forbes*; near Maritzburg, *St. George* 13; near Dundee, *Green* 84; (*Wood* 7455); near Durban, *Wood* 5999.

Baron Mueller says of this grass:—"The 'Guinea grass.' Tropical Africa; elsewhere not indigenous. This perennial grass attains a height of 8 feet. It is highly nutritious, and quite adapted for the warmer temperate zone, being hardy as far south as Buenos Ayres. In Jamaica it is the principal fodder grass up to elevations of 5,000 feet, springing up over wide tracts of country almost to the exclusion of everything else. It forms large bunches, which, when cut young, supply a particularly sweet and tender hay; throws out numerous stolons; can be mown every six weeks; the roots can be protected in the ground against light frosts by a thin covering with soil. A favourite grass in tropical countries for stall fodder. . . . . It is necessary to guard against over-feeding with this grass solely. Succeeds even on poor clay soil and on sea sand."

Fig 1, Lower glume; 2, upper glume; 3, lower valve; 4, pale; 5, stamens and lodicules; 6, upper valve; 7, pale; 8, stamens, pistil and lodicules. *All enlarged.*

PANICUM MAXIMUM. *JACQ.*

PANICUM LÆVIFOLIUM. *HACK.*

PLATE 157.

PANICUM LAEVIFOLIUM, HACK. (Fl. Cap. Vol. VII., p. 405).

Nat. Order Gramineæ.

ANNUAL.—CULMS fascicled, erect or ascending, 1 to $2\frac{1}{2}$ feet long, glabrous, compressed to subterete, 3 to 5-noded, with flowering branches from most of the nodes.

LEAVES glabrous; sheaths lax, mostly shorter than the internodes, pallid, striate; ligules membranous, up to $\frac{1}{2}$ line long, ciliate; blades linear, shortly tapering to a very acute point, 3 to 8 inches, by 2 to $3\frac{1}{2}$ lines, suberect, flat or folded, light green, smooth.

PANICLE erect, ovate, $\frac{1}{2}$ to 1 foot long, very lax, open; axis slender, smooth; branches solitary or 2-3-nate, remote the longest up to $\frac{1}{4}$ to $\frac{1}{2}$ foot long, repeatedly and very laxly divided from $\frac{1}{2}$ to $1\frac{1}{2}$ inch above the base, branchlets finely filiform to capillary, scaberulous, the ultimate divisions 2-spiculate; pedicels capillary, 2 to 4 lines long, tips clavate.

SPIKELETS oblong, obtuse, not compressed, slightly over 1 line long, pallid or tinged with purple, quite glabrous.

GLUMES, *lower* much broader than long, clasping, very obtuse or subacuminate, $\frac{1}{6}$ to $\frac{1}{4}$ line long; *upper* thin, subherbaceous, oblong, obtuse, slightly over 1 line long, 7 to 9-nerved. Florets, *lower* male; valve like the upper glume, 9-nerved: pale subequal to the valve; anthers $\frac{1}{2}$ line long; perfect floret elliptic-oblong, subobtuse, 1 line long, whitish, quite smooth; valve obscurely 5-nerved. Grain oblong, obtuse.

Habitat: NATAL. Van Reenen, 5-6000 feet alt., March, *Wood* 6014; near De Beers Pass, March, 5-6000 feet alt., *Wood* No. 5997; Shirley, Mooi River, 4-5000 feet alt., March, *W. T. Woods*; Mooi River, 5-6000 feet alt., March, *Mason* 36, (*Wood* 7319); near Dundee, 5-6000 feet alt., *Green* 36.

Drawn from *Mason's* 36, which was collected at "borders of cultivated land near Mooi River."

Specimens of 4 indigenous grasses were received for determination from Mr. H. Ryle Shaw, editor of the "Agricultural Journal." They proved to be *Digitaria sanguinale*, *Setaria aurea*, *Eleusine indica*, and the above described grass, *Panicum laevifolium*, Nees. These were collected by Mr. W. T. Woods, of Shirley, Mooi River, who for 40 years has been a stock farmer in Natal. He says of them: "Commonly known as 'land grasses' which appear on the bottom lands of Mooi River district when drained and cultivated. The yield is enormous, and the hay much preferable to that of the short hill veldt." Of *P. laevifolium*, he says: "'Buffalo Grass' grows in tussocks 4 feet high, readily eaten by stock while green, and makes coarse but useful hay; easily cut by mower, grows on poor land."

I would only add that the grass known in the coast districts as "Buffalo-grass" is *Setaria sulcata*, Raddi, formerly known here as *Panicum excurrens*, Nees.

Fig 1, Portion of leaf with ligule: 2, lower glume: 3, upper glume: 4, lower valve; 5, pale; 6, stamens and lodicules of male flower: 7, upper valve; 8, pale: 9, stamens, pistil and lodicules. *All enlarged.*

PLATE 158.

PANICUM MEYERIANUM, NEES. (Fl. Cap. Vol. VII., p. 406).

Nat. Order Gramineæ.

PERENNIAL.—CULMS ascending from a decumbent branched rooting base (always ?) rather stout, 2 to 3 feet long, terete, glabrous, 5 to many noded, sheathed all along or the upper 1-2 nodes exserted.

LEAVES more or less glaucous; sheaths rather loose, glabrous, except at the pubescent nodes, or with scattered tubercle-based hairs; ligule a fringe of very short hairs; blades linear-lanceolate from a rounded contracted base, long tapering to a fine point, 4 to 8 inches, by 3 to 6 lines, glabrous except at the minutely villous junction with the sheath.

PANICLE subpyramidal, 3 to 6 inches long, up to 4 inches wide; axis very slender, angular, glabrous or pubescent below the nodes, angles scaberulous at least in the upper part; branches usually obliquely spreading, scattered or the lower opposite or subopposite, the upper simple or subsimple, racemose; the lower distantly branched almost from the finely tomentose base, more or less secund, filiform, scaberulous, the lowest up to 3 inches long; pedicels solitary or 2-nate, the longer up to 1 line long, filiform, scaberulous and usually with 1 to 3 fine long hairs, tips discoid.

SPIKELETS rather crowded, at least towards the tips of the branches and branchlets, ovate-oblong, acute to subacuminate, $1\frac{1}{2}$ line long, glabrous, glaucous, contracted at the base into a very short stalk.

GLUMES; *lower*, minute, truncate or apiculate, hyaline, white or purplish; *upper* membranous, oblong, acute to subacuminate, faintly 5-nerved. Florets, *lower* male; valve like the upper glume; pale equal to the valve, oblong, anthers $\frac{1}{2}$ line long; perfect floret oblong, obtuse or minutely apiculate; valve subcoriaceous, 5-nerved, whitish, very finely pitted; anthers up to $\frac{3}{4}$ line long.

Habitat: NATAL. Near the Umzimkulu River, *Drège*; banks of the Tugela River, *Buchanan* 266; Umhlanga, May, *Wood*, 6057; 6062.

Drawn from Wood's 6057.

I have no information as to the value of this grass as a fodder.

Fig 1, Portion of rhachis with spikelet; 2, lower glume; 3, lower valve; 4, pale; 5, stamens and lodicules; 6, upper valve; 7, pale; 8, stamens, pistil and lodicules. *All enlarged.*

PANICUM MEYERIANUM. *NEES.*

PANICUM PROLIFERUM. *LAM.*

Var: B longijubatum, Stapf.

PLATE 159.

PANICUM PROLIFERUM, Lam. var. longijubatum, Stapf. (Fl. Cap. Vol. VII., p. 406.)

Nat. Order Gramineæ.

PERENNIAL (?) tufted.—CULMS erect or geniculate, very stout, spongy below, about 4 feet long, glabrous, smooth, many-noded, sheathed all along, or the upper nodes exserted, subsimple; sheaths loose, striate, glabrous; ligules, very short, membranous, densely ciliate; blades linear, long tapering to an acute point, up to 1 foot by 2 to 4 lines flat, smooth below, very scabrid above, sometimes with a few fine hairs, midrib whitish.

PANICLE erect or nodding, decompound, narrow or rather open, large, 10 to 14 inches long; axis slender, sulcate, scabrid, at least upwards; branches subopposite, or partly solitary or the lower 3-4-nate at very unequal distances, the longest 6 to 10 inches long, undivided for 1 to 2 inches from the base, remotely branched filiform, subflexuous and, like the very fine branchlets, angular and usually very scabrid; pedicels usually 2-nate, unequal, suberect, the longer up to $2\frac{1}{2}$ lines long, tips slightly thickened.

SPIKELETS oblong to oblong-lanceolate, acute to acuminate, scarcely compressed, $1\frac{1}{4}$ line long, greenish.

GLUMES, *lower* hyaline, whitish, broadly clasping at the base, truncate, $\frac{1}{4}$ to $\frac{2}{5}$ line long, obscurely 3 to 5-nerved; *upper* one thinly membranous below, oblong to oblong lanceolate, acute to subacuminate, $1\frac{1}{4}$ line long, prominently 7 to 9-nerved. Florets, *lower* barren, valve like the upper glume; pale oblong subacute, 2-keeled, 1 line long; perfect floret narrowly oblong, acute, up to 1 line long, smooth, shining, yellowish; valve subcoriaceous, 7-nerved; anthers $\frac{1}{2}$ line long. Grain over $\frac{1}{2}$ line long, white.

Habitat: NATAL Near the Umzimkulu River, *Drège*; common near Umpumulo, *Buchanan* 267; near Durban, *Williamson* 21; Zululand, *Jenkinson* 63 (*Wood* 7340).

Drawn from Jenkinson's specimen.

A polymorphous species inhabiting India, South Africa, and the Atlantic side of America from Maine to the Argentine; elsewhere very rare and apparently introduced. The typical form occurs only in the Atlantic States of North America, and is distinguished by its annual duration, rather low growth, prolific ramification, and scantier nervation of the spikelets, the upper glume being 7 and the lower only 5-nerved.

Var. *longijubatum* occurs also on the River Shire in Nyassaland, whilst var. *paludosum* is common through India, in marshes and still waters.

Mr. Jenkinson says of it: "Grows in separate tufts."

Fig 1, Lower glume; 2, lower valve; 3, pale; 4, upper valve; 5 pale; 6, ovary and lodicules *All enlarged.*

PLATE 160.

PANICUM COLORATUM, LINN. (Fl Cap. Vol. VII, p. 409).

Nat. Order Gramineæ.

PERENNIAL.—CULMS erect or ascending from a geniculate, often decumbent and branched base, rather stout, 2 feet or more long, glabrous, 4 to 8-noded, internodes more or less exserted; sheaths striate, glabrous or more or less hirsute, with tubercle-based hairs, the upper rather tight; ligule a membranous minutely or obscurely ciliate rim; blades linear to lanceolate-linear from a usually widened and rounded base, tapering to an acute point, 5 to 8 inches, by $2\frac{1}{2}$ to $4\frac{1}{2}$ lines, flat, suberect, slightly rigid or sometimes flaccid, glabrous or sparsely hairy, glaucous or subglaucous, margins smooth or scaberulous, more or less tubercled towards the base.

PANICLE erect or nodding, lax, 4 to 9 inches long, up to 6 inches broad when fully expanded; axis very slender, smooth, at least below; branches solitary, opposite or 2-4-nate, distant, the lowest 4 to 7 inches long, filiform to capillary, straight or flexuous, loosely divided from $\frac{1}{2}$ to $2\frac{1}{2}$ inches above the base, scaberulous or smooth below. Pedicels solitary or 2-nate, unequal, the longer 1 to $1\frac{1}{2}$ line, with cupular tips.

SPIKELETS scattered or in scattered clusters, or more or less approximate, oblong, acute, 1 to $1\frac{1}{4}$ line long, glabrous, green or purple.

GLUMES, *lower* very broadly ovate, acute, up to $\frac{1}{2}$ line long, 3 to sub-5-nerved; *upper* one oblong, subacute, prominently 7-nerved. Florets, *lower* one male; valve like the upper glume, sometimes very slightly longer, 9-nerved; perfect floret narrow, oblong, subacute, almost 1 line long, yellowish, shining, smooth; valve 7-nerved; anthers $\frac{3}{4}$ to $\frac{4}{5}$ line long.

Habitat: NATAL. Banks of Tugela River, 600 feet, *Buchanan* 262.

Also in Bechuanaland, Transvaal, Nyassaland, Lower Zambesi, and Egypt.

Drawn from Buchanan's specimen, which is very imperfect, but the only one we have.

The spikelets are very similar to those of *P. repens*, but on the whole smaller. This, together with the mode of growth and the more graceful and ampler ramification of the panicle, makes the distinction of *P. coloratum* from broad leaved forms of *P. repens* easy. *P. coloratum* of Jacquin (Ic. 1, 12), which is often quoted as synonymous with *P. coloratum*, Linn, is identical with *P. virgatum*, Linn, an American plant.

Fig 1, Lower glume; 2, upper glume; 3, lower valve; 4, pale; 5, stamens and lodicules; 6, upper valve; 7, pale; 8, stamens, pistil and lodicules. *All enlarged.*

PANICUM COLORATUM. *LINN.*

PANICUM DREGEANUM. *NEES.*

PLATE 161.

PANICUM DREGEANUM, NEES. (Fl. Cap. Vol. VII., p. 411).

Nat. Order Gramineæ.

PERENNIAL, tufted, innovation shoots intravaginal. CULMS erect, slender, firm, 1 to over 2 feet long, glabrous, terete, with about 2 exserted nodes.

LEAVES mostly crowded at the base ; sheaths tight, striate, ciliate, and usually villous at the junction of the blade, otherwise glabrous or sparingly and softly hairy, the lower very firm, fugaciously tomentose at the base, persistent ; ligule a minutely ciliate rim ; blades narrowly linear, gradually passing into and often distinctly narrowed towards the sheath, tapering to a fine point, 5 to 14 inches long by 1 to 2 lines wide, erect, usually convolute, sometimes flat, rigid, glabrous except the more or less hairy or villous base, scabrid, closely and prominently nerved.

PANICLE erect, more or less contracted, decompound, delicately branched, oblong, 4 to 8 inches long ; axis slender, scaberulous ; branches solitary, 2 or 3-nate or irregularly approximate, the longest 2 to $3\frac{1}{2}$ inches long, and undivided for $\frac{1}{2}$ to $1\frac{1}{2}$ inch, then laxly branched, filiform, scabrid, branches subcapillary or capillary ; pedicels solitary or 2-nate, unequal, the longer often up to 3 to 5 inches long, capillary, scabrid, tips subcupular.

SPIKELETS somewhat obliquely ovoid and obliquely acuminate, slightly over 1 line long, greenish or more or less purplish, gaping, prominently nerved.

GLUMES, similar, almost boat-shaped, ovate to oblong-ovate, acute or sub-acuminate, *lower* one about $\frac{1}{2}$ to $\frac{3}{4}$ the length of the spikelet, often mucronulate, 5 to 7-nerved ; *upper* one equalling the spikelet, 7-nerved. Florets, *lower* male ; valve very similar to the upper glume, 5-nerved ; pale equal to the valve, oblong, subacute, flaps very broad at the base. Anthers $\frac{1}{2}$ to $\frac{1}{3}$ line long ; perfect floret oblong, obtuse, $\frac{3}{4}$ line long, smooth, shining, white or yellowish, tips sometimes purplish ; valve subcoriaceous, very faintly 5 to 7-nerved.

Habitat: NATAL. Mouth of the Umzimkulu River, *Drège;* near Durban, *Drège* ; *McKen* 133 ; *Williamson* 25 ; Ingone, *Sutherland;* and without precise locality, *Buchanan* 117 ; 261 ; *Gerrard* 477 ; Berea, March, *Wood* 5939.

Drawn from Wood's 5939, and compared with Buchanan's 261.

Also in Nyassaland.

Fig 1, Spikelet ; 2, lower glume ; 3, upper glume ; 4, lower valve ; 5, pale ; 6, stamens and lodicules ; 7, upper valve ; 8, pale ; 9, stamens, pistil and lodicules. *All enlarged.*

PLATE 162.

PANICUM NATALENSE, HOCHST. (Fl. Cap. Vol. VII., p 412).

Nat. Order Gramineæ.

PERENNIAL, compactly tufted; whole plant glabrous.—CULMS erect, slender, wiry, $\frac{3}{4}$ to $1\frac{1}{2}$ foot long, 1-2-noded, uppermost internode usually long exserted.

LEAVES crowded near the base; sheaths terete, tight, firm, the lowest persistent; ligule an obscurely ciliolate rim; blades filiform, $\frac{1}{2}$ to over a foot long, $\frac{3}{8}$ to $\frac{1}{2}$ line thick, terete, acute, canaliculate, wiry, flexuous, very rarely partly flat, strongly nerved and sometimes minutely hairy on the upper surface, smooth.

PANICLE erect, lax, contracted or open, 2 to 6 inches long; axis filiform, like the subcapillary or capillary branches, branchlets and pedicels smooth; branches mostly solitary or irregularly approximate, laxly divided from near the base, the longest $\frac{3}{4}$ to 2 inches long; pedicels solitary or 2-nate, very unequal, the longer 1 to 4 lines long, tips subcupular.

SPIKELETS turgid, broadly ovate to ellipsoid, obtuse, 1 line long, light green, sometimes tinged with purple, glabrous.

GLUMES subequal, subherbaceous, very similar, elliptic, more or less obtuse, 5-nerved. Florets, *lower* male; valve like the glumes; pale subequal to the valve. Anthers $\frac{1}{2}$ to $\frac{5}{8}$ line long: perfect floret ovate, obtuse or subacute, $\frac{3}{4}$ to $\frac{4}{5}$ line long, white, smooth; valve coriaceous, faintly 5-nerved.

Habitat: NATAL. Novelo Hills, 7000 feet alt., *Sutherland*; margins of woods near the Umlazi River, *Krauss* 188; Inanda, *Wood* 1592; and without precise locality, *Buchanan* 73, 258; Van Reenen, 5-6000 feet alt., December, *Wood* 7219; *F. Lauth*, Pearson's Falls, May; Zululand, *Jenkinson*, December (Wood 7310).

Drawn from Wood's 7219.

This grass is also found in Basutoland and Transvaal. Mr. Jenkinson gives the native name as Ntolwana.

Fig. 1, Lower valve; 2, pale; 3, stamens and lodicules; 4, upper valve; 5, pale; 6, pistil, stamens, and lodicules. *All enlarged.*

PANICUM NATALENSE. *HOCHST.*

PANICUM ECKLONII. *NEES.*

PLATE 163.

PANICUM ECKLONII, NEES. (Fl. Cap. Vol. VII., p. 413).

Nat. Order Gramineæ.

PERENNIAL, compactly tufted, innovation shoots intravaginal.—CULMS erect, very slender, 1 to 1½ foot long, glabrous, 1-noded, 3 to 4 inches above the base, uppermost internode long exserted.

LEAVES crowded at the base, strongly and closely nerved, more or less hirsute with tubercle-based hairs; sheaths tight, strongly bearded at the nodes and often at the mouth, the lower firm, persistent; ligule a ciliate rim; blades linear, acute, 1½ to 5 inches long by 1½ to 2 lines wide, rather firm, flat, margins very scabrid.

PANICLE erect, linear to oblong, rather lax or contracted, 2 to 4 inches long; axis filiform, like all its divisions glabrous; branches alternate, or the lowest 2-nate, suberect, loosely divided almost from the base or from ¼ to ½ inch above it, ultimate branchlets 4-1-spikulate, capillary, flexuous; pedicels 1 to 4 lines long, tips subclavate.

SPIKELETS oblong, obtuse, 1¼ to 1½ line long, erect, glabrous, pallid or tinged with purple.

GLUMES herbaceously membranous, nerves running out into teeth; *lower* one broad, ovate, ⅓ to ½ the length of the spikelet, 3-nerved and 3-toothed; *upper* one oblong, 3 to 5 toothed, 5-nerved, equalling ⅔ to ⅘ the length of the spikelet. Florets, *lower* one barren, reduced to the valve, which is similar to the upper glume and 1½ line long. Perfect floret, oblong, acute, equalling the lower floret; valve subcoriaceous, white or yellowish or purplish towards the minutely hairy, subrostrate tip, 7-nerved. Anthers 1 line long.

Habitat: NATAL. Karkloof, April, *J. Wylie* (*Wood* 6017); Mooi River, December, *Mason* 33 (*Wood* 7318).

Fig 1, Lower glume; 2, upper glume; 3, lower valve; 4, upper valve; 5, pale; 6, pistil, stamens and lodicules. *All enlarged.*

PLATE 164.

PANICUM INTERRUPTUM, WILLD. (Fl. Cap. Vol. VII., p. 413).

Nat. Order Gramineæ.

PERENNIAL.—CULMS ascending from a creeping rooting base, 3 to 5 feet high, stout, very spongy, internodes mostly exserted.

LEAVES glabrous; sheaths loose, striate, tranversely veined, the submerged sometimes spreading, flattened and bladeless; ligules membranous, truncate, up to 1 line long; blades linear from a scarcely constricted base, long tapering to an acute point, 4 to 12 inches long, by 3 to 6 lines wide, flat, flaccid, very closely nerved, scaberulous, margins scabrid

PANICLE erect, spike-like, cylindric, 6 to 12 inches long, by $3\frac{1}{2}$ to 5 lines wide; axis stout, sulcate, smooth; branches spirally arranged, very numerous, adpressed, filiform, smooth, up to 2 lines long, divided from the base or reduced to fascicles of disc-tipped pedicels.

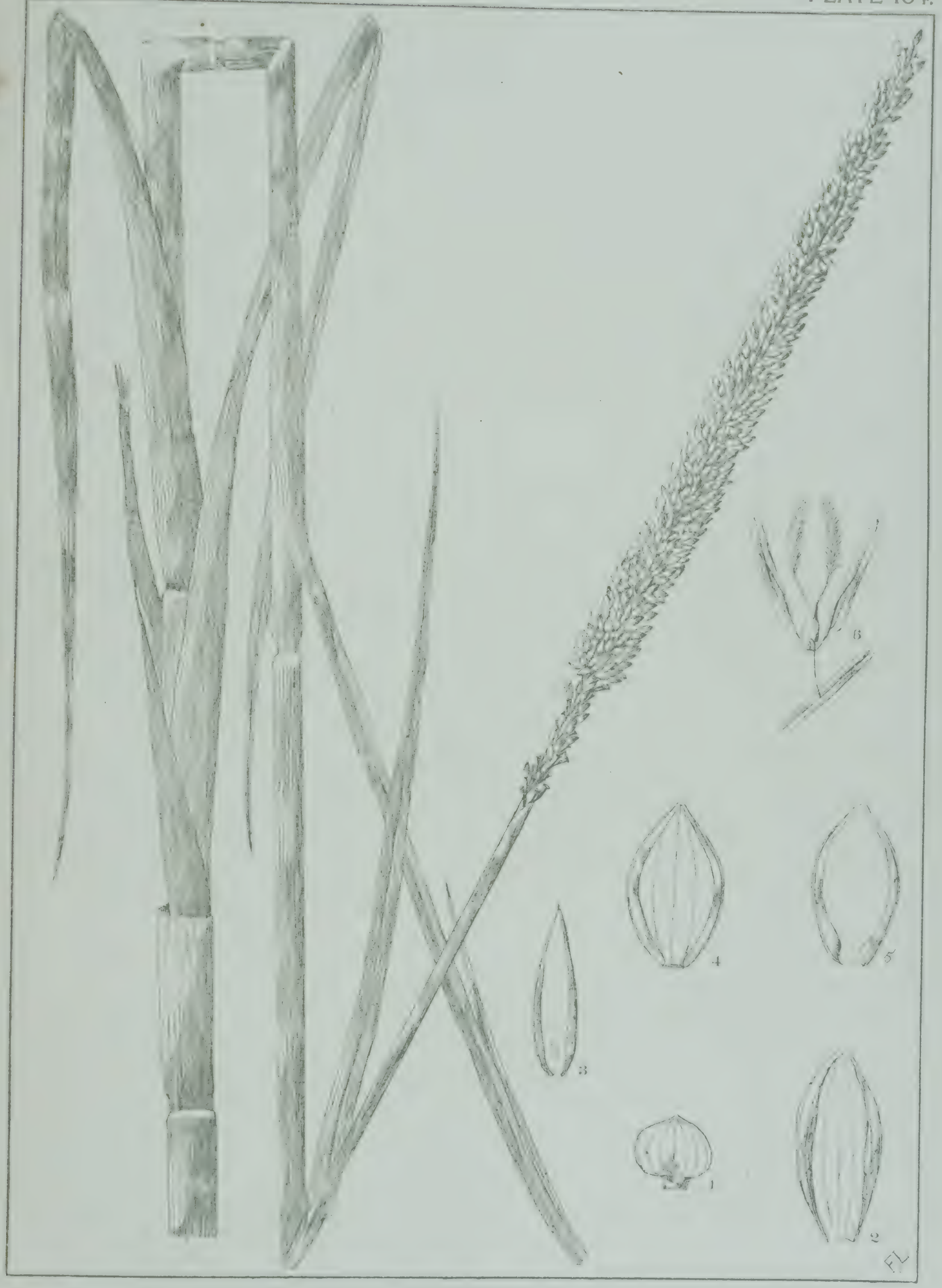
SPIKELETS oblong, acute or subacute, sometimes slightly curved, $1\frac{1}{2}$ to 2 lines long, glabrous, olive-green with dark tips.

GLUMES, *lower* one hyaline, almost orbicular, $\frac{1}{4}$ to $\frac{1}{3}$ the length of the spikelet, finely 5 to 7-nerved; *upper* one herbaceous-membranous, oblong, prominently 9-nerved. Florets, *lower* one barren; valve like the upper glume; pale about $\frac{3}{4}$ the length of the valve, hyaline. Perfect floret, oblong obtuse, whitish or yellowish, 1 to $1\frac{1}{8}$ line long; valve chartaceous, obscurely 5-nerved. Anthers $\frac{1}{2}$ line long

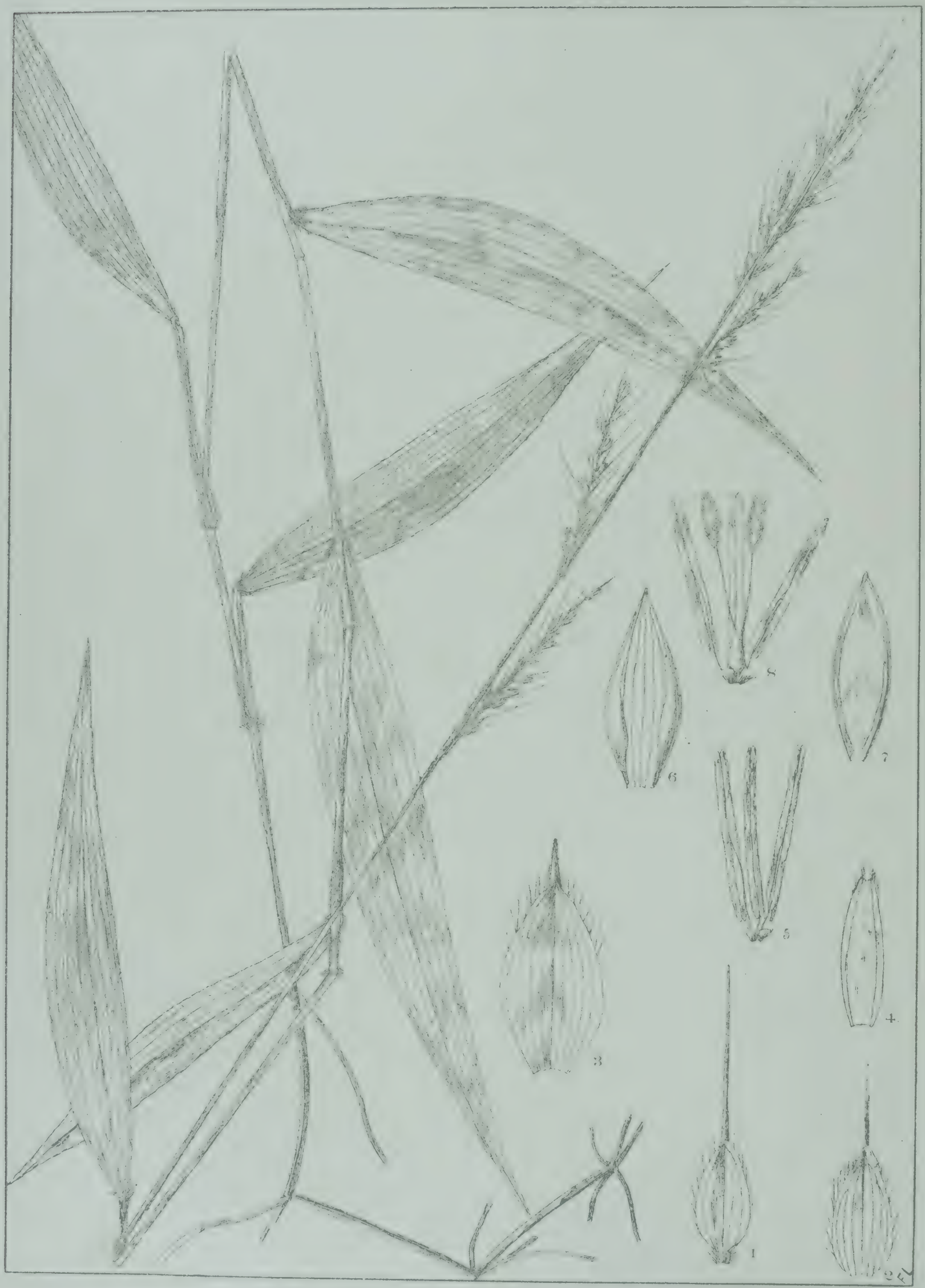
Habitat: NATAL. In stagnant water near Durban, *Drège* 4709; in similar situation, Durban Flat, *Wood* 3589.

Throughout tropical Africa and India to South China and Malaya.

Fig. 1, Lower glume; 2, lower valve; 3, pale; 4, upper valve; 5, pale; 6, pistil, stamens and lodicules. *All enlarged.*



PANICUM INTERRUPTUM. *WILLD*



OPLISMENUS AFRICANUS. *BEAUV.*

PLATE 165.

OPLISMENUS AFRICANUS, BEAUV. (Fl. Cap. Vol. VII., p. 417).

Nat. Order Gramineæ.

PERENNIAL.—CULMS ascending from an often long decumbent rooting base, 1 to 1½ foot high, slightly compressed below; sheaths rather tight, strongly striate, finely villous or ciliate along the outer margin, otherwise glabrous except a transverse villous line at the junction with the blade (in the African specimens), rarely more or less hirsute; ligules up to ½ line long; blades lanceolate from a slightly rounded base, acuminate, 2 to 5 inches by 4 to 7 lines (those of the lower leaves and barren shoots often much smaller and ovate-lanceolate), flat, thin, dull green, soft, scantily and minutely hairy to almost velvety below, scaberulous above, at least upwards, margins scabrid.

RACEMES 3 to 8 on an erect straight or flexuous, more or less 3-winged glabrous or finely hairy axis, the *lower* distant, erect or obliquely spreading, 3 to 9 lines long, rarely longer, the *upper* closer, much shorter or reduced to 2 or 3-spiculate clusters, the axis usually terminated by a solitary spikelet; rhachis of racemes straight, triangular, dorsally flat, greyish from very minute adpressed hairs, usually fringed with tubercle-based bristles (in the African specimens), tomentose or hispid at the base. Pedicels 2-nate or solitary, very short and stout, usually with a few bristles.

SPIKELETS ovate-oblong, about 1⅓ line long, greyish-green or green, minutely bearded at the base.

GLUMES subequal, 1 to 1½ line long, thinly herbaceous, ovate to elliptic, produced into filiform subobtuse smooth more or less viscous, often purplish awns, hairy at least near the margins, rarely quite glabrous, *lower* 5-nerved, awn 3 to 6 lines long, *upper* 7 to 5-nerved, awn 1 to 2 lines long. Florets *lower* barren, rarely male, equalling the spikelet. Valve 9 to 7-nerved, obscurely or shortly mucronate. Perfect floret lanceolate-oblong, acute or obscurely cuspidate, 1 to 1½ line long, whitish, smooth, shining. Valve coriaceous, 7-nerved. Anthers ¾ to ⅞ line long. Grain 1 line long.

Habitat: NATAL Between the Umzimkulu and Umkomaas Rivers, *Drège* 4336; between Mapumulu and Riet Vlei 2000 to 5000 feet alt., *Buchanan* 219; and without precise locality, *Cooper* 3378; *var simplex*, Inanda, 1800 feet alt., *Wood* 1306.

Drawn from Buchanan's 219.

Usually found in shady woods.

Fig 1, Lower glume; 2, upper glume; 3, lower valve; 4, pale; 5, stamens and lodicules; 6, upper valve; 7, pale; 8, pistil, stamens and lodicules. *All enlarged.*

Axonopus (Beauv.), Hook. f.

Nat. Order Gramineæ.

Spikelets ovate to lanceolate-oblong, mucronate or awned, slightly or conspicuously compressed from the back, falling entire from the solitary, geminate or fascicled (and then very unequal) pedicels of more or less digitate or whorled racemes. Florets, *lower* male, *upper* perfect.

Glumes unequal, *lower* smaller, hyaline, 3 to 1-nerved, mucronate, acute or acuminate, *upper* equal or subequal to the spikelet, membranous, 5-nerved, mucronulate or muticous, submarginal nerves densely villous or ciliate. Valves subequal, *lower* resembling the upper glume, shortly or scantily villous or glabrous, *upper* chartaceous, glabrous or scantily ciliate, 5-nerved, produced into a mucro or short awn. Pales dissimilar, of the lower floret very short, hyaline, 2-partite, flaps auricled; of the perfect floret more or less equalling the valve, entire, 2-keeled, flaps very narrow, broadly auricled near the base. Lodicules 2, broadly cuneate. Stamens 3, styles distinct; stigmas laterally exserted. Grain enclosed by the rigid valve and pale, oblong, plano-convex; embryo about half the length of the grain; hilum basal, punctiform.

PLATE 166.

Axonopus semialatus, Hook. f. var Ecklonii, Stapf. (Fl. Cap. Vol. VII., p. 418).

Perennial, compactly tufted.—Culms erect, 1 to 3 feet long, glabrous or more or less hairy, usually 2-noded with uppermost internode long exserted. Sheaths strongly striate, rather tight, more or less hairy, lowest fugaciously tomentose, firm, persistent; ligules very short, truncate. Blades linear from a slightly or distinctly narrowed base, acute, 3 to 12 inches, by 2 to 3 lines, flat, firm, rigid, strongly and closely nerved, softly hirsute with tubercle-based hairs.

Racemes 2 to 5, digitate or subdigitate, suberect, usually straight, rather stout and dense, often subsecund, $1\frac{1}{2}$ to 3 inches long, rarely longer, subsessile or some distinctly peduncled; rhachis slender, angular, hairy, at least below, pedicels mostly 2-nate, angular, scabrid or pubescent, very short, up to 2 lines long.

Spikelets ovate-oblong, $2\frac{1}{2}$ to 3 lines long, very slightly compressed, light green, usually tinged with purple or quite purplish.

Glumes *lower* ovate, mucronulate, $\frac{1}{2}$ to $\frac{3}{4}$ the length of the spikelet, glabrous or minutely pubescent at the tip; *upper* ovate-oblong, densely villous along the margins; valve of male floret finely woolly above, near the margins, of the perfect floret oblong, scantily and finely ciliate, produced into a fine mucro or short awn (up to $1\frac{1}{2}$ line long). Anthers up to $1\frac{3}{4}$ line long.

Habitat: Natal. Umpumulo to Riet Vlei, 2000 to 5000 feet alt., *Buchanan* 180; near Durban, *Krauss* 55; Inanda, 1800 feet alt., *Wood* 1593; Polela, 6000 to 7000 feet alt., *Evans* 521; and without precise locality, *Gerrard* 470.

Also in India. Drawn from Wood's 1593.

Fig. 1, Lower glume; 2, upper glume; 3, lower valve; 4, pale; 5, stamens and lodicules; 6, upper valve; 7, pale; 8, pistil, stamens and lodicules. *All enlarged.*

AXONOPUS SEMIALATUS. *HOOK.*

Var: Echlonii, Stapf.

Setaria, Beauv.

Spikelets ovate to oblong, falling entire from the pedicel, subtended by 1 to many persistent bristles (modified branchlets), which often form a one-sided involucre (see Section *Ptychophyllum*), subsessile in contracted spike-like or more or less open panicles. *Lower* floret male, or reduced to the valve, and a more or less arrested pale; *upper* floret perfect.

Glumes membranous, *lower* generally much smaller, usually 3 to 5 rare'y 1 or 7-nerved; *upper* usually 5, sometimes 7-nerved. *Lower* valve more or less exceeding and resembling the upper glume; *upper* va ve chartaceous to coriaceous, 5-nerved. Pales subequal to their valves or that of the lower floret more or less arrested, flat, 2-nerved, hyaline in the lower, of the same substance as the valve in the upper floret. Lodicules 2, broadly cuneate. Stamens 3. Styles distinct; stigmas laterally exserted. Grain tightly enclosed by the hardened valve and pale, oblong or ellipsoid; hilum basal, punctiform or orbicular; embryo about half as long as the grain.

Section 1, *Ptychophyllum.*—Blades long, plicately folded when young, at length opening out. Panicles almost spike-like or more or less open with elongated branches and crowded or somewhat distant spikelets; bristles solitary, terminating the branches and branchlets and usually also subtending at least a part of the lateral spikelets, or sometimes in fascicles at the base of the branches.

S. sulcata; S. Lindenbergiana.

Section 2, *Eu-Setaria.*—Blades not plicately folded when young; panicles usually spike-like and dense or compact, with very short (rarely elongated) branches; bristles often crowded into more or less one-sided involucres subtending solitary or clustered spikelets.

S. nigrirostris; S. Gerrardii; S. perennis; S. rigida; S. imberbis; S. verticillata.

PLATE 167.

SETARIA SULCATA, RADDI. (Fl Cap. Vol. VII, p. 421).

Nat. Order Gramineæ.

PERENNIAL.—CULMS erect or ascending from a short, prostrate and rooting base, stout, 5 to 12 feet high, compressed below, sometimes pubescent and scabrid close to the panicle, otherwise usually glabrous and smooth, 5 or more noded, sheathed almost all along or upper internodes exserted; sheaths long, rather tight, glabrous or hirsute, the lowest strongly compressed, subpersistent; ligule a densely ciliate rim; blades lanceolate to linear-lanceolate from a long and much attenuate or even petioled base, tapering to an acute point, $1\frac{1}{2}$ to 3 feet long, by 1 to $3\frac{1}{2}$ inches broad, closely plicately folded when young, then opening out (folds very numerous), glabrous or hairy, scabrid above towards the tip.

PANICLE linear or linear-oblong, usually interrupted, 1 to more than 2 feet long, often nodding; axis angular, glabrous or puberulous, scaberulous above; branches solitary, irregularly approximate or almost whorled, $\frac{1}{2}$ to 6 inches long, scabrid, spike-like, dense, bearing fascicles of spikelets below and solitary spikelets above, or the lower with similar more or less distant branchlets at the base; bristles solitary, fine, scaberulous, wavy, 1 to 8 inches long, terminating the branches and branchlets and at the base of some or most of the lower and middle spikelets; pedicels very short, scabrid, tips subdiscoid.

SPIKELETS oblong, acute, $1\frac{1}{2}$ line long, glabrous, green or tinged with purple.

GLUMES herbaceous-membranous, very broadly ovate, obtuse or subacute, *lower* 3-nerved, $\frac{1}{3}$ to almost half as long as the spikelet; *upper* 5 to sub-7-nerved, $\frac{1}{2}$ to $\frac{2}{3}$ as long as the spikelet. Florets, *lower* barren, rarely male, equalling the upper or almost so; valve ovate-oblong, acute, 5 to sub-7-nerved, of the same texture as the glumes; pale slightly shorter than its valve or more or less reduced. Perfect floret oblong, acuminate, $1\frac{1}{2}$ line long, tips often recurved; valve sub-coriaceous, 5-nerved, pale or finally brown particularly upwards, smooth or very obscurely wrinkled. Anthers $\frac{2}{3}$ line long.

Habitat: NATAL. Near Durban, *Drège*; Berea, March, *Wood* 6927; Zululand 1500 feet alt., *Jenkinson* 54.

Drawn from specimens gathered on Berea, March.

Throughout tropical Africa and America.

This plant was formerly known in Natal as *Panicum excurrens*, Nees; it is a common grass on the coast and in the midlands, is usually found at edges and in light bush; it is a coarse grass and not liked by cattle, in Natal often called "Buffalo Grass." The figure of the plant in the illustration is much reduced. Mr Jenkinson says of this grass: "Native name 'Ubabe' (Omkulu). Only found in small patches in shady and sheltered spots. Excellent fodder; keeps green through winter."

Fig 1, Fascicle of spikelets; 2, lower glume; 3, upper glume; 4, lower valve; 5, pale; 6, upper valve; 7, pale; 8, pistil, stamens and lodicules. *All enlarged.*

SETARIA SULCATA. *RADDI.*

SETARIA LINDENBERGIANA, *STAPF.*

PLATE 168.

SETARIA LINDENBERGIANA, Stapf. (Fl. Cap. Vol. VII., p. 422.)

Nat. Order Gramineæ.

PERENNIAL.—CULMS erect, simple or branched near the base, slender, 2 to 3 feet long, glabrous or pubescent and sometimes with long soft hairs near the panicle, 5 or more noded with the lower internodes short and enclosed when simple. Branches few-noded. Sheaths tight, keeled above, striate, glabrous or hairy to hirsute, lower firm, persistent, often strongly compressed; ligule a ciliate rim. Blades linear or linear-lanceolate from a long attenuate base, tapering to a fine point, 3 to 12 inches, by $1\frac{1}{2}$ to 6 lines, closely plicately folded when young, at length opening out (folds 8 to 12), usually glabrous, scaberulous above.

PANICLE linear to oblong, usually almost spike-like, often interrupted or lobed, dense or lax, 2 to 6 inches long; axis angular, pubescent; branches alternate or irregularly approximate, 2 to 12 lines long, filiform, wavy, puberulous, simple or divided from near the base; bristles solitary, fine, scaberulous, wavy, 1 to 5 lines long, terminating the branches and branchlets, or sometimes in fascicles at the base of the branches or solitary at the base of the lower spikelets; pedicels very short, tips discoid.

SPIKELETS ovate-oblong, acute, 1 to $1\frac{1}{4}$ line long, glabrous, light green or tinged with purple.

GLUMES membranous, broadly ovate, obtuse; *lower* 5 to sub-7-nerved, rather less than half as long as the spikelet; *upper* 7-nerved, equalling about $\frac{3}{4}$ the length of the spikelet. Florets, *lower* male, equalling the spikelet; valve membranous, broadly elliptic, obtuse, 7-nerved; pale subequal to the valve, with narrowly winged keels. Perfect floret elliptic-oblong, acute, equalling the lower floret; valve subcoriaceous, 5-nerved, pallid or purplish, particularly upwards, finely and closely transversely wrinkled. Anthers $\frac{1}{2}$ line long.

Habitat: NATAL. Inanda, 1800 feet alt., *Wood* 1419; in shady woods by the Umgeni River, *Krauss* 130.

Also in Cape Colony, Orange River Colony, and in Tropical East Africa.

Fig 1, Portion of rhachis: 2, lower glume: 3, upper glume; 4, lower valve: 5, pale; 6, stamens and lodicules; 7, upper valve: 8, pale; 9, pistil, stamens and lodicules. *All enlarged.*

PLATE 169.

SETARIA NIGRIROSTRIS, Dur. & Schinz. (Fl. Cap. Vol. VII., p. 423).

Nat. Order Gramineæ.

PERENNIAL, rhizome short, oblique, præmorse.—CULMS erect or subgeniculate, slender, $\frac{1}{2}$ to more than 2 feet long, compressed, pubescent and scabrid just below the panicle and usually more or less tomentose below the nodes, otherwise glabrous and smooth, 1 to 3-noded, internodes usually enclosed except the uppermost. Sheaths tight, firm, strongly striate, glabrous except on the ciliate margins and tomentose nodes, or sparingly hairy, lowest short and fugaciously hairy like the innovation bud-scales, very firm, persistent, dark brown; ligules very short, ciliate. Blades linear to linear-lanceolate, often with a gradually narrowed base, tapering to an acute point, 4 to 9 inches (rarely more) by 3 to 4 lines, rather firm, flat or involute, glabrous, smooth or margins scaberulous.

PANICLE spike-like, cylindric, stout, rather dense, sometimes interrupted, 1 to 5 inches, by 3 to 5 lines; axis angular, finely villous; branches reduced to subsessile clusters of 2 or 3 spikelets or to a single spikelet, each subtended by a fascicle of 3 or 4, or if solitary, by as many as 8 coarse subflexuous scaberulous bristles, $2\frac{1}{2}$ to $4\frac{1}{2}$ lines long with slightly thickened almost smooth and blackish tips; pedicels stout, very short, tips discoid.

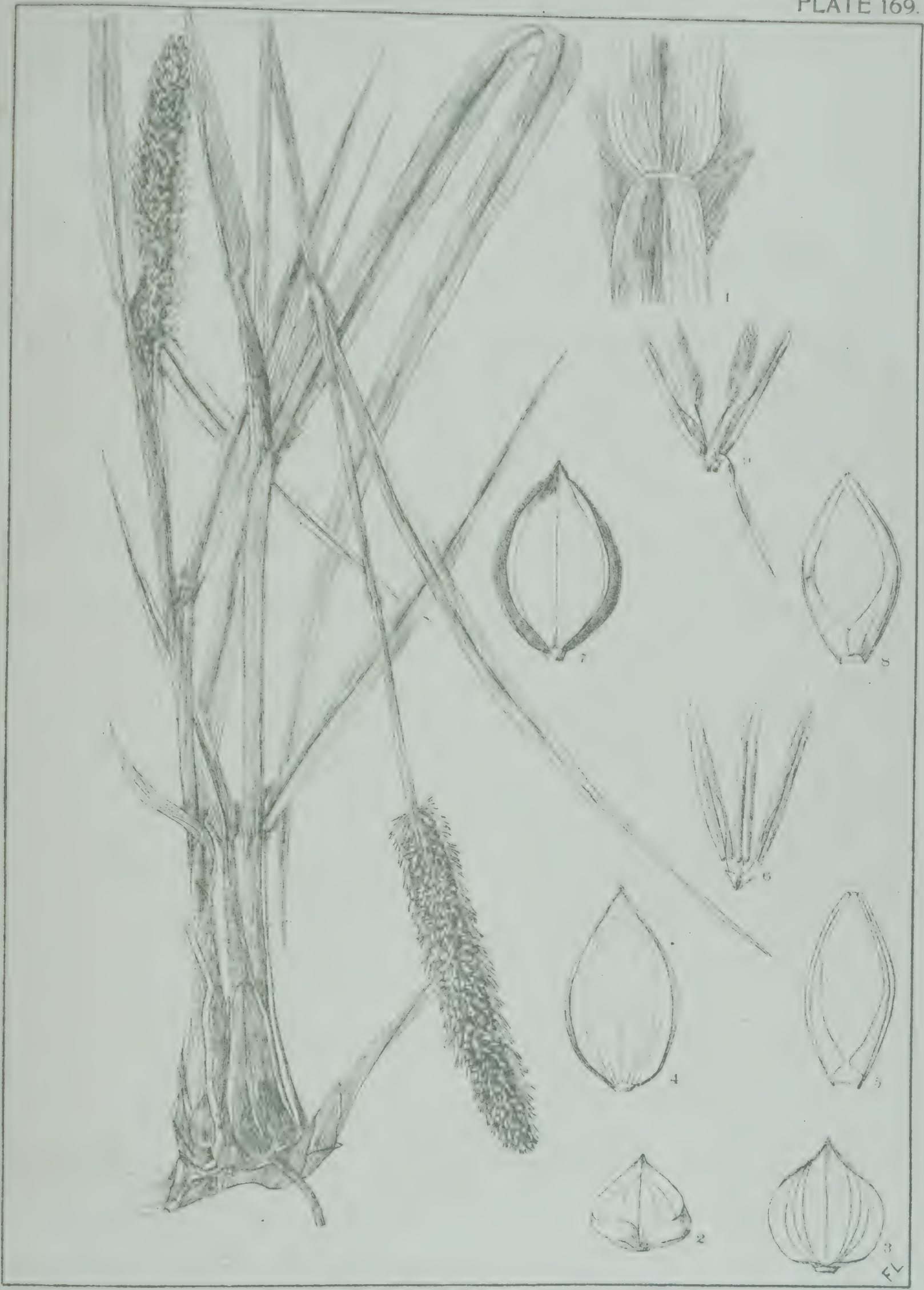
SPIKELETS turgid, obliquely ovoid, $1\frac{3}{4}$ to $2\frac{1}{4}$ lines long, pale with dark tips, glabrous.

GLUMES firmly membranous, *lower* broadly ovate, acute, about half as long as the spikelet or slightly longer, 5-nerved; *upper* oblong, very concave, subapiculate, almost as long as the spikelet or shorter by $\frac{1}{4}$ or $\frac{1}{5}$, 7-nerved. Florets, *lower* male; valve equalling the upper floret, oblong, subapiculate, 5-nerved; pale equalling the valve. Perfect floret elliptic-oblong, slightly beaked; valve 5-nerved, very convex, finely honeycombed, yellowish, beak purple or blackish; anthers 1 to $1\frac{1}{4}$ line long.

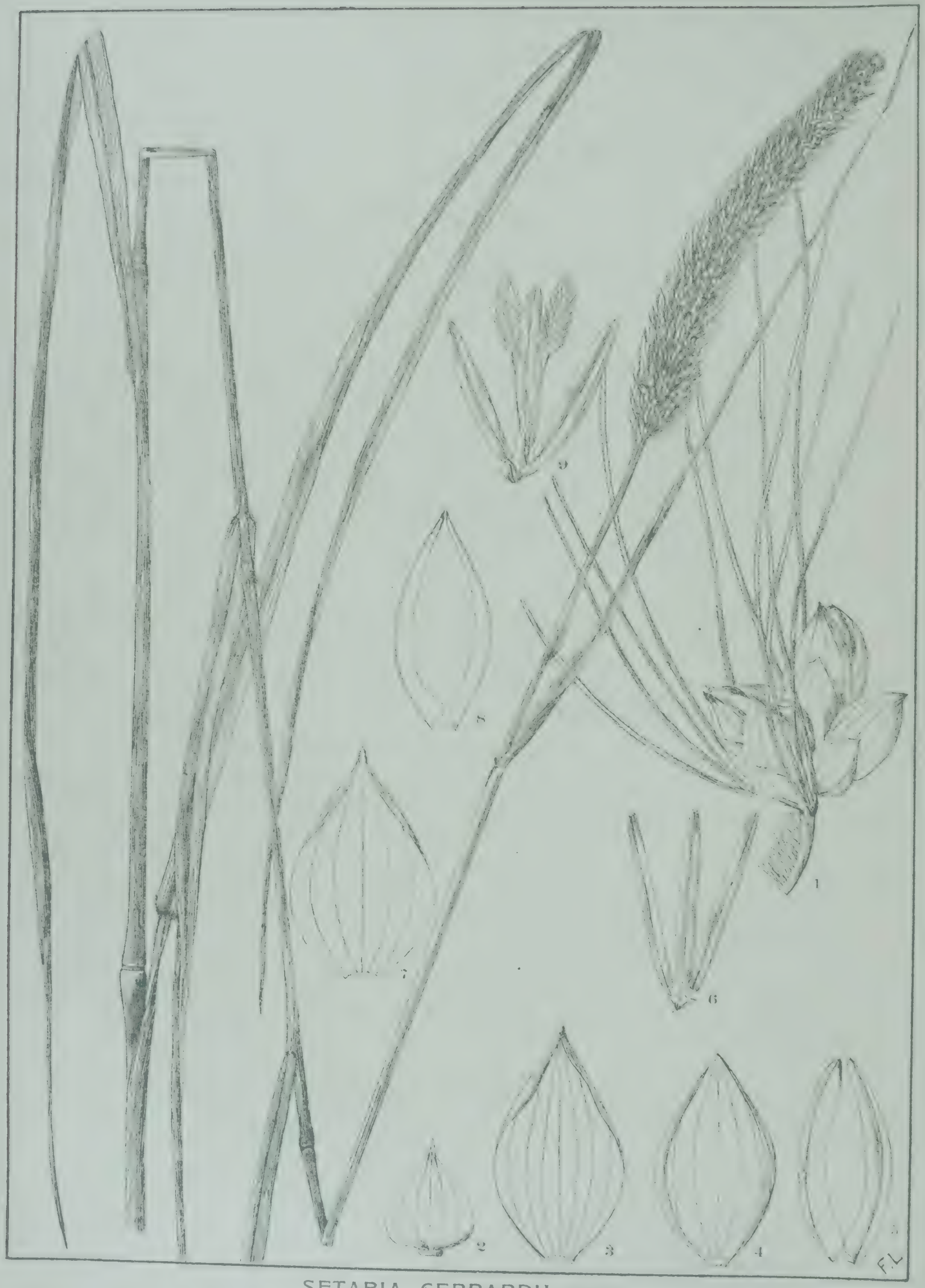
Habitat: NATAL Riet Vlei, 4000 feet alt., *Buchanan* 174; near Camperdown, 2000 feet alt., *Wood* 4096.

Drawn from Wood's 4096, and compared with Buchanan's 174.

Fig. 1, Portion of leaf with ligule; 2, lower glume; 3, upper glume; 4, lower valve; 5, pale; 6, stamens and lodicules; 7, upper valve; 8, pale; 9, pistil, stamens, and lodicules. *All enlarged.*



SETARIA NIGRIROSTRIS. *DUR. & SCH.*



SETARIA GERRARDII. *STAPF.*

PLATE 170.

SETARIA GERRARDII, Stapf. (Fl. Cap. Vol. VII, p. 424).

Nat. Order Gramineæ.

PERENNIAL, rhizome short, præmorse, oblique.—CULMS erect, $2\frac{1}{2}$ to $3\frac{1}{2}$ feet long, compressed below, villous close to the panicle, otherwise smooth and glabrous, 2 to 4-noded, internodes usually long exserted, except the lowest. Sheaths tight, striate, glabrous except on the ciliate margins and very finely silky nodes, lower compressed, keeled, pallid or purplish, firm, persistent, fugaciously hairy at the base, 2 to 6 inches long; ligule a very densely and long ciliate rim. Blades narrow, linear, tapering to a very long fine point, over 1 foot by $1\frac{1}{4}$ to 2 lines (unfolded), usually folded or involute above, flexuous, glaucous, glabrous, margins cartilaginous, scabrid.

PANICLE spike-like, cylindric, dense, $1\frac{1}{2}$ to 3 inches, by 3 to 4 lines; axis subvillous, branches reduced to subsessile clusters of 2-3 spikelets or to a single spikelet, each spikelet subtended by a fascicle of 3 4 or, if solitary, by 6-8 slender subflexuous bristles, 4-6 lines long, purple from the middle, scabrid all along, pedicels very short, tips discoid.

SPIKELETS obliquely ovoid, $1\frac{1}{4}$ to $1\frac{1}{2}$ line long, whitish, glabrous.

GLUMES firmly membranous, *lower* one ovate, acute, about half as long as the spikelet, 5-nerved; *upper* one oblong, very concave, subapiculate, shorter than the spikelet by $\frac{1}{4}$, 7-nerved; *lower* floret male; valve equalling or slightly exceeding the upper floret, oblong, 5-nerved, subapiculate; pale equal to the valve. Perfect floret elliptic-oblong, slightly beaked, $1\frac{1}{2}$ line long; valve very convex, 5-nerved, very finely honeycombed, pallid, sometimes with a dark spot near the tip. Anthers almost 1 line long.

Habitat: NATAL. Without precise locality, *Gerrard* 681; *Buchanan* 224; Umhlanga, May, *Wood* 6063; Zululand, January, *Jenkinson* 59 (*Wood* 7338); *Green*, Dundee, March.

Fig. 1, Cluster of spike'ets; 2, lower glume; 3, upper glume; 4, lower valve; 5, pale; 6, stamens and lodicules; 7, upper valve; 8, pale; 9, pistil, stamens and lodicules. *All enlarged.*

PLATE 171.

SETARIA PERENNIS, Hack. (Fl. Cap. Vol. VII., p. 424).

Nat. Order Gramineæ.

PERENNIAL, densely cæspitose.—CULMS erect, very slender, 8 to 16 inches long, slightly compressed below, 2 to 3-noded, simple, finely puberulous or scaberulous close to the panicle, otherwise smooth, internodes enclosed or slightly exserted except the uppermost Sheaths terete, tight, glabrous, or sparingly hairy, lowest very firm, closely and strongly striate, persistent; ligule a minutely ciliolate rim; blades erect, very narrow, linear, tapering to a very fine point, usually setaceously convolute, 2 to 8 inches, by $\frac{1}{2}$ to $\frac{3}{4}$ line (rarely $1\frac{1}{2}$ line when expanded), rigid, with scattered very fine spreading hairs.

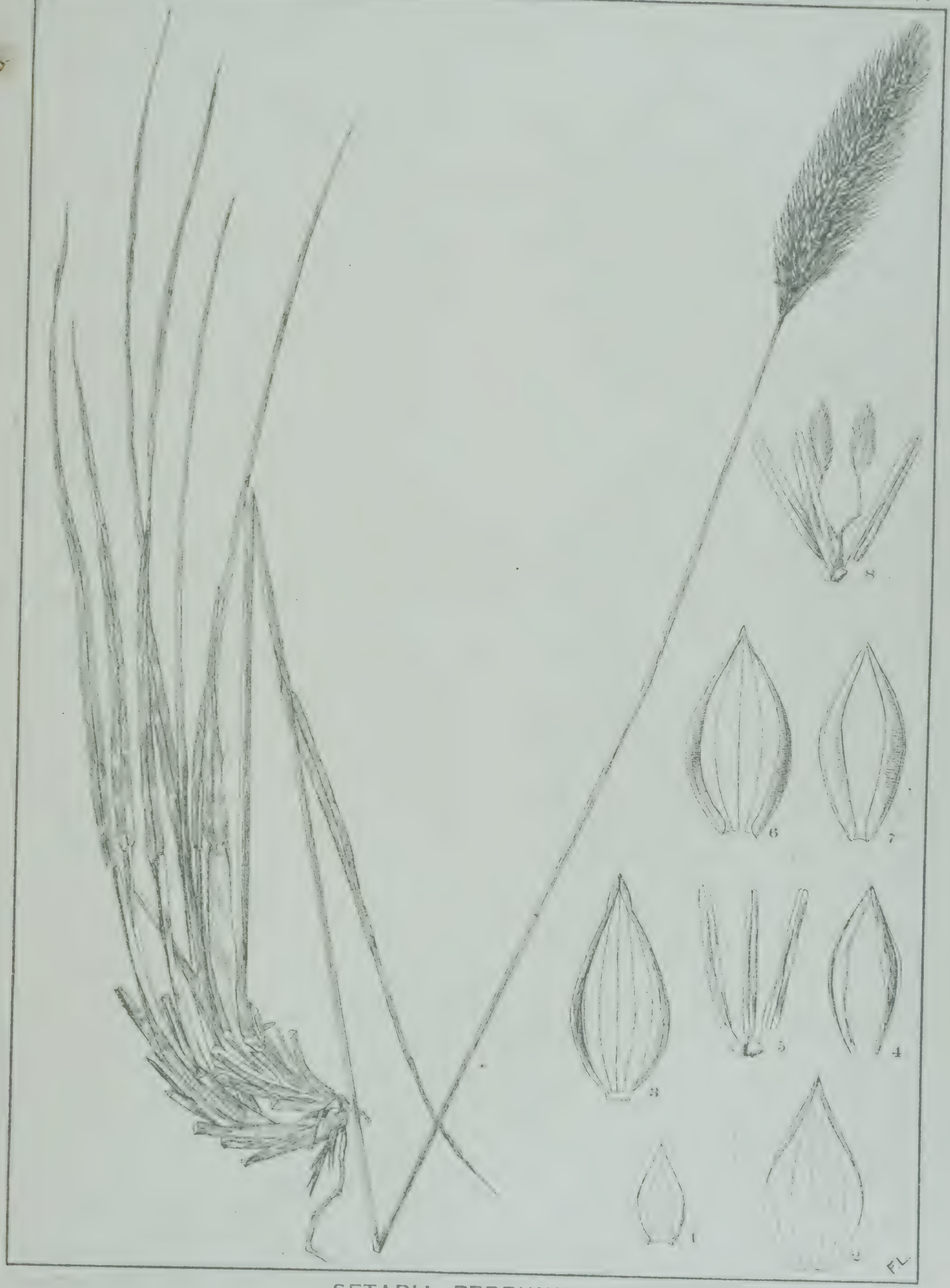
PANICLE spike-like, cylindric, very dense, $\frac{3}{4}$ to 2 inches, by 2 to 3 lines; axis, puberulous; branches reduced to a single spikelet subtended by a subsessile one-sided involucre of 4 to 6 fine subequal scaberulous bristles, 2 to 3 lines long, purplish or yellow above.

SPIKELETS oblong, acuminate, apiculate, $1\frac{1}{2}$ line long, pallid, glabrous.

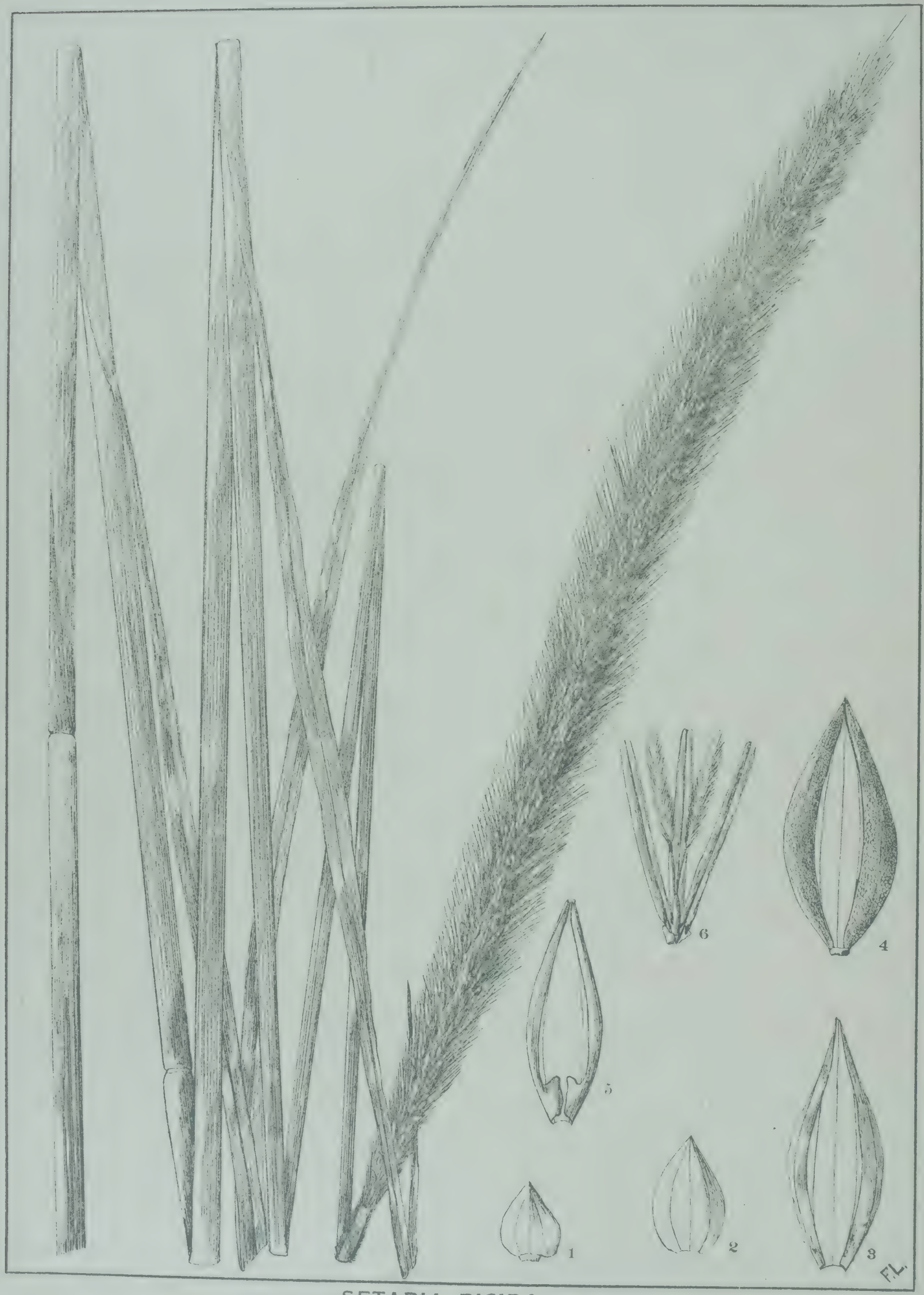
GLUMES membranous, *lower* broadly ovate, acute or subacute, about half as long as the spikelet or slightly longer, 3-nerved; *upper* ovate-oblong, acute or acuminate, shorter than the spikelet by one-half, 5-nerved; *lower* floret male; valve oblong, acuminate or apiculate, $1\frac{1}{2}$ line long, 5-nerved; pale slightly shorter than the valve; perfect floret slightly shorter than the male, elliptic-oblong, apiculate, pallid; valve very finely and closely transversely wrinkled, 5-nerved, tips obscurely 3-toothed or mucronulate. Anthers over half line long.

Habitat: NATAL Dundee, 4-5000 feet alt., *Green* (*Wood* 7357); Dundee, *Green* 54 (*Wood* 7361); near Maritzburg, *St. George* 5a (*Wood* 7242); near Verulam, 500 feet alt., November, *Wood* 8647.

Fig 1, Lower glume; 2, upper glume; 3, lower valve; 4, pale; 5, stamens and lodicules; 6, upper valve; 7, pale; 8, pistil, stamens and lodicules. *All enlarged.*



SETARIA PERENNIS *HACK.*



SETARIA RIGIDA, *STAPF.*

PLATE 172.

SETARIA RIGIDA, Stapf. (Fl. Cap. Vol. VII., p. 426).

Nat. Order Gramineæ.

PERENNIAL.—CULMS erect, rather stout, over $2\frac{1}{2}$ feet long, more or less compressed or angular, glabrous, very rough below the panicle. Sheaths long, rather tight and firm, smooth, glabrous except at the bearded mouth or along the ciliate margin; ligules truncate, very short, densely ciliolate. Blades erect, very narrow, linear, subpungent, half to more than 1 foot long, 1 to $1\frac{1}{2}$ line wide (unfolded), rigid, folded (or involute in the upper part), sparingly hairy towards the base, margins rough.

PANICLE spike-like, cylindric, sometimes sub-interrupted, 5 to 9 inches, by 3 lines, coarsely bristly; axis subangular, hairy; branches reduced to subsessile clusters of 5 to 8 partly arrested spikelets, each of which is subtended by one coarse scabrid subflexuous bristle, 3 to 5 lines long. Pedicels very short, tips cupular.

SPIKELETS oblong, acute or subacute, slightly curved, slightly over 1 line long, straw-coloured.

GLUMES, *lower* ovate or almost round, obtuse or acute, less than $\frac{1}{2}$ line long, hyaline, 3-nerved; *upper* similar, $\frac{1}{2}$ to $\frac{2}{3}$ line long. Florets, *lower* barren, equalling the upper; valve oblong, membranous, 5-nerved; pale 0. Perfect floret oblong; valve subcoriaceous, very finely punctate, 5-nerved. Anthers over $\frac{1}{2}$ line long.

Habitat: NATAL. Umpumulo, 2400 feet alt., *Buchanan* 12; 173; Zululand, 2000 feet alt., *Jenkinson* 58 (*Wood* 7337).

Drawn from Jenkinson's specimen and compared with Buchanan's 173.

Fig 1, Lower glume; 2, upper glume; 3, lower valve; 4, upper valve; 5, pale; 6, pistil, stamens and lodicules. *All enlarged.*

PLATE 173.

SETARIA IMBERBIS, Roem & Schult. (Fl. Cap. Vol. VII., p 427).

Nat. Order Gramineæ.

ANNUAL.—CULMS often copiously fascicled, ascending from a geniculate base, slender, $\frac{1}{2}$ to 3 feet long, branched, terete or compressed below, deeply grooved and compressible in the upper part where they are sometimes swollen and very finely villous or puberulous and scabrid, otherwise glabrous and smooth, 3 to 7-noded, internodes slightly exserted or at length slipping out of the sheaths; sheaths striate, glabrous; ligules very short, membranous, truncate, up to $\frac{1}{2}$ line long, ciliate; blades narrow, linear, long, tapering to an acute point, 2 to 6 inches long by 1 to 3 lines wide, flat, flaccid, glabrous (in the African specimens), rarely slightly rigid and involute and with long scattered hairs, finely scaberulous.

PANICLE erect, straight or flexuous, cylindric, slender, $\frac{1}{2}$ to 3 inches long by about 2 lines wide, dense; axis slender, minutely villous or puberulous; branches reduced to a subsessile one-sided involucre of 3 to 8 fine scabrid bristles, $1\frac{1}{2}$ to 4 lines long, pallid below, fulvous or reddish above, and subtending usually one perfect and often one arrested spikelet.

SPIKELETS elliptic-oblong, minutely apiculate or obtuse, 1 to $1\frac{1}{2}$ line long, pallid or purplish at the tips, glabrous.

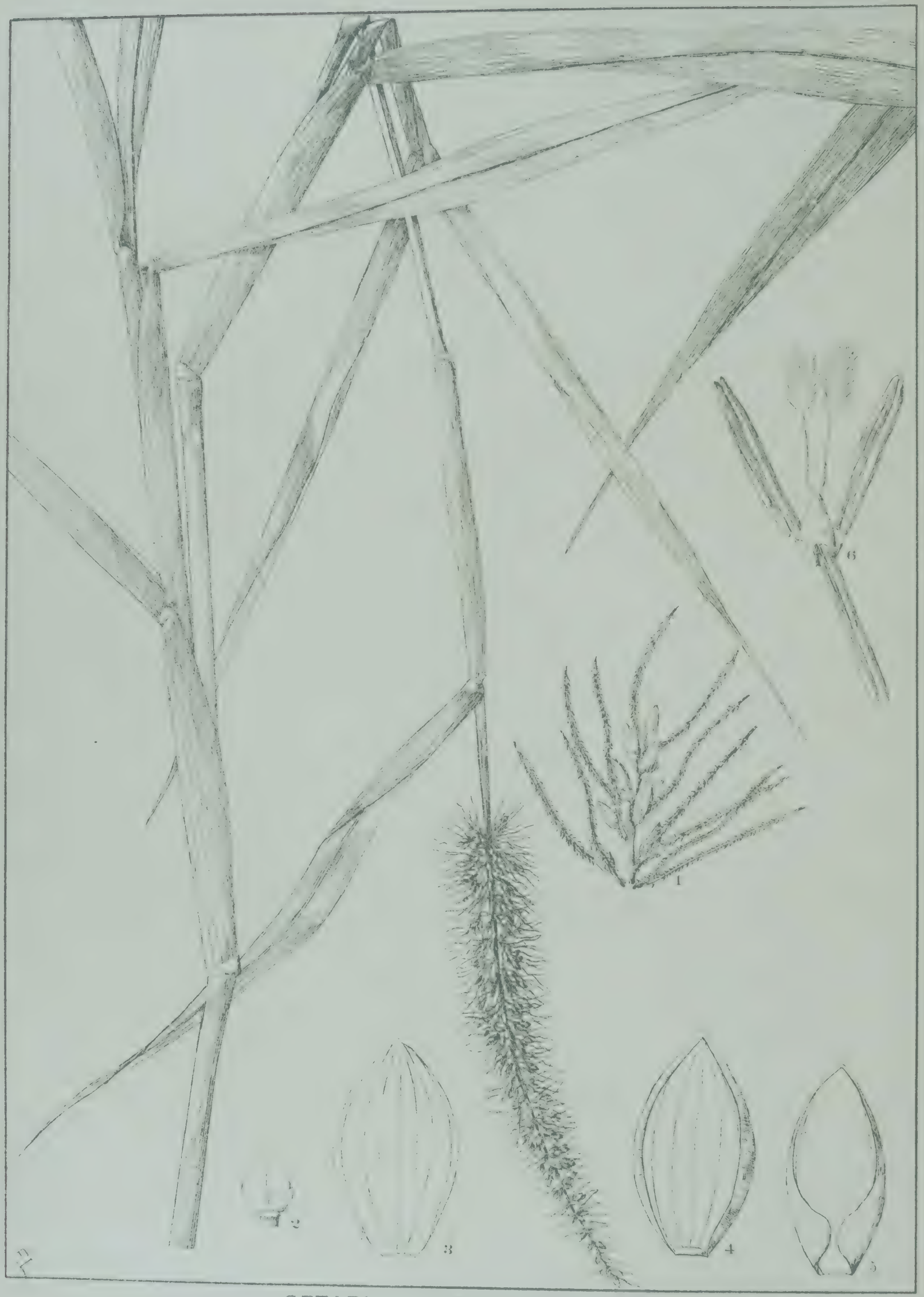
GLUMES very thin, membranous, ovate, acute or subacute, whitish, *lower* 3-nerved, rather less than half as long as the spikelet; *upper* 5-nerved, rather more than half as long as the spikelet, nerves green; *lower* florets equal, *lower* barren or male; valve equalling the spikelet, flat, similar to the upper glume; pale subequal to the valve; perfect floret plano-convex, ovate-elliptic, usually minutely apiculate, pallid or purplish at the tips; valve coriaceous, transversely wrinkled, 5-nerved. Anthers $\frac{1}{4}$ line long.

Habitat: NATAL. Greytown, 3000 feet alt., *Buchanan* 177; near the Tugela River, 3000 feet alt., *Buchanan* 176; and without precise locality, *Buchanan* 177c; Van Reenen, 5-6000 feet alt., March, *Wood* 5991.

Also in the Mascarene Islands and in Tropical East Africa; very common throughout Tropical America.

Fig. 1, Lower glume; 2, upper glume; 3, lower valve; 4, pale; 5, upper valve; 6, pale; 7, pistil, stamens and lodicules. *All enlarged.*

SETARIA IMBERBIS. *RŒM & SCHULT.*



SETARIA VERTICILLATA. *BEAUV.*

PLATE 174.

SETARIA VERTICILLATA, Beauv. (Fl. Cap. Vol. VII., p. 429).

Nat. Order Gramineæ.

ANNUAL.—CULMS erect or ascending from a geniculate base, $\frac{1}{2}$ to 5 feet long, usually compressed below, more or less branched, glabrous, smooth, or scabrid below the panicle, 4 to 9-noded, internodes mostly at length exserted; sheaths thin, rather lax, usually compressed, striate, glabrous, or finely hairy upwards; ligules short, truncate, densely ciliate; blades linear or lanceolate-linear from a broad and rounded, or from a narrow base, long tapering to an acute or subsetaceous point, 2 to 12 inches, by 2 to 6 (rarely up to 12) lines wide, thin, flat, flaccid, scaberulous, usually finely and scantily hairy.

PANICLE erect or curved, spike like, cylindric or oblong, dense or rather lax, 1 to 5 inches long, coarsely bristly; axis scabrid and often pubescent; branches spirally arranged, close, in robust specimens, the lower up to 4 lines long, with a distinct scabrid angular rhachis and 2-nate spikelets, otherwise very short or reduced to sessile clusters, each spikelet subtended by a coarse reversely scabrid bristle 2 to 7 lines long.

SPIKELETS ellipsoid, obtuse, about 1 line long, light green, glabrous, *lower* glume hyaline, broad, ovate, acute, 1 to sub-3-nerved, $\frac{1}{4}$ to $\frac{2}{5}$ as long as the spikelet, *upper* membranous, elliptic, concave, 5 to 7-nerved, equal to the spikelet or almost so; *lower* floret barren; valve similar to the upper glume, dorsally flattened, 5 to 7-nerved; pale hyaline, more or less arrested or 0. Perfect floret elliptic-oblong, plano-convex, subapiculate or obtuse, almost 1 line long, greenish or straw-coloured; valve subcoriaceous, very obscurely wrinkled, 5-nerved. Anthers $\frac{3}{8}$ line long; grain broadly ellipsoid, over $\frac{3}{4}$ line long, white, subtranslucent.

Habitat: NATAL. Durban Flat, *Buchanan*; near Durban, *Williamson* 14; Umpumulo and near the Coast, *Buchanan* 165; and without precise locality, *Gerrard* 682; Zululand, *Jenkinson* 4; Berea, March, *Wood* 5946.

Fig 1, Branch with spikelets; 2, lower glume; 3, upper glume; 4, upper valve; 5, pale; 6, pistil, stamens and lodicules. *All enlarged.*

Pennisetum, Pers.

Nat. Order Gramineæ.

Spikelets oblong or lanceolate, solitary or in clusters of 2 to 4, subtended by and deciduous with sessile or peduncled involucres of naked or plumose bristles (rarely reduced to a solitary bristle in Section *Beckeropsis*), and arranged round the axis of spike-like usually cylindric panicles, *lower* floret male or barren with or without a pale; *upper* perfect.

Glumes usually small and hyaline, *lower* sometimes suppressed, *upper* rarely $\frac{1}{2}$ the length of the spikelet or more, and then several to 7-nerved. Valves equal or subequal, membranous to chartaceous, 5 to 7-nerved, or the lower more or less reduced, thinner, fewer nerved. Pales subequal to the valve and of similar texture, 2-nerved, or more or less reduced in the lower floret. Lodicules small, usually in front and outside the pale or 0. Stamens 3. Styles distinct, slender or connate. Grain enclosed by the slightly changed valve and pale (see also *P. typhoideum*), broadly oblong, slightly dorsally compressed to subglobose; hilum basal, punctiform; embryo large, $\frac{1}{2}$ to $\frac{3}{4}$ the length of the grain.

Section 3, *Gymnothrix*.—Involucre sessile; spikelets usually solitary, rarely 2-3 in each involucre; bristles never plumose; anther tips usually naked; styles almost free or more or less connate or cohering to $\frac{1}{2}$ their length, rarely higher up.

PLATE 175.

Pennisetum natalense, Stapf. (Fl. Cap. Vol. VII., p. 435).

Perennial.—Culms branched near the base, over $1\frac{1}{2}$ foot long, sheathed all along (or the lowest internodes at length naked), firm, smooth and glabrous. Leaves quite glabrous, glaucous. Sheaths firm, glabrous, finely striate, tight or the uppermost slightly tumid; ligule a fringe of short silky hairs. Blades linear, long tapering to a fine or setaceous point, $\frac{1}{2}$ to almost 1 foot, by 1 to 3 lines, firm, rather rigid, and generally convolute, smooth except the cartilaginous scabrid margins.

Panicle spike-like, slender cylindric, 5 to 8 inches, by about 3 lines, pallid; rhachis slender, scaberulous like the very short pedicels. Involucres of numerous pallid slender scabrid bristles of unequal length, the longer half as long again as the spikelet, one conspicuously stouter and much longer than the rest.

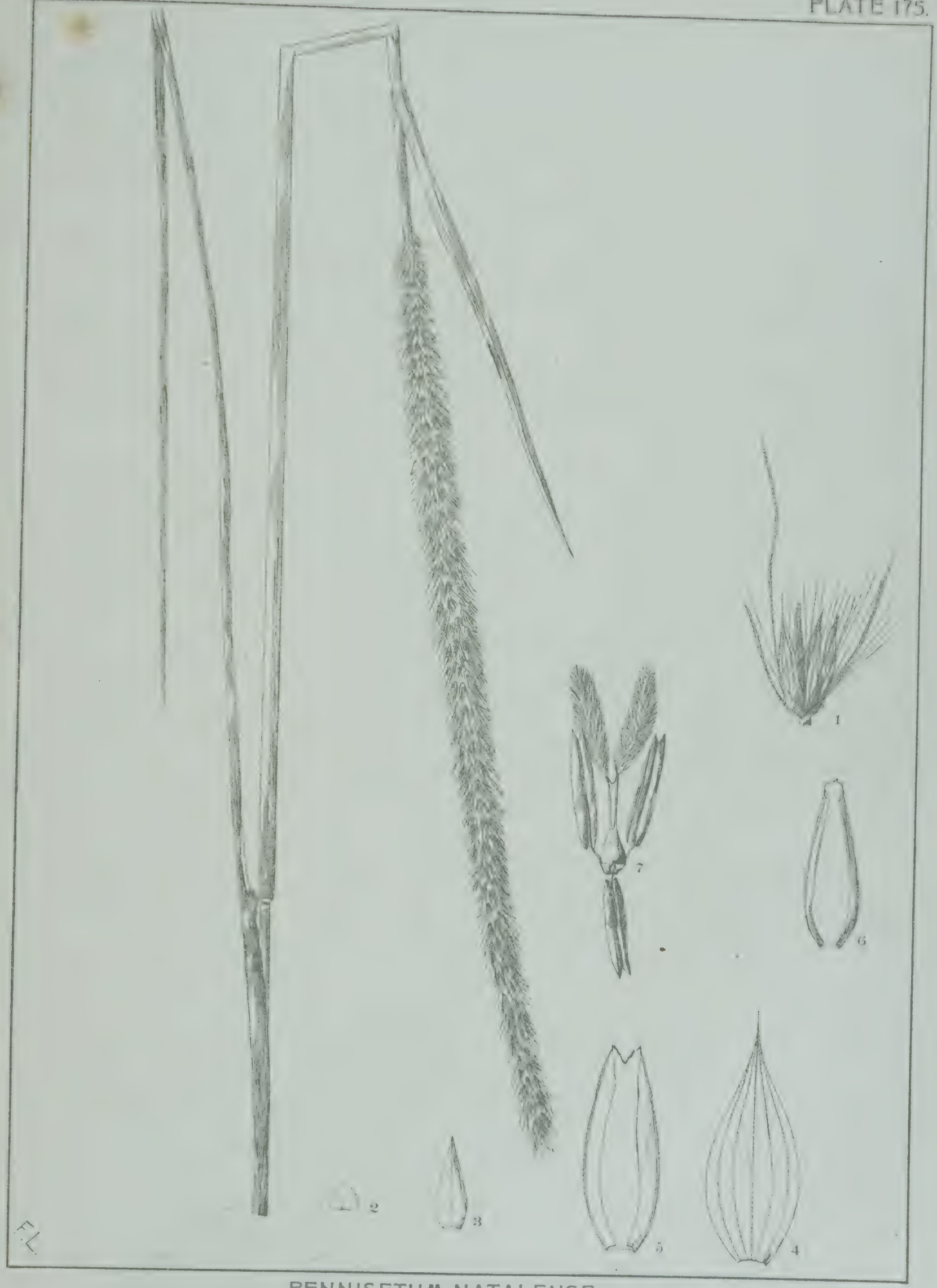
Spikelets solitary, ovate-oblong, slightly over $1\frac{1}{2}$ line long, pallid or purple at the tips, glabrous.

Glumes hyaline, *lower* very minute, nerveless, *upper* ovate, acuminate, less than $\frac{1}{2}$ line long, 1-nerved. *Lower* floret male; valves very similar, broadly ovate-oblong, suddenly and shortly acuminate, or the upper mucronate, 5-nerved; lodicules small but distinct; anthers not quite 1 line long, tips acute, naked; styles connate at the very base.

Habitat: Natal. Umpumulo, *Buchanan* 172.

Drawn from *Buchanan's* 172, the only specimen in the Herbarium.

Fig, 1, Spikelet; 2, lower glume; 3, upper glume; 4, lower valve; 5, pale; 6, pale of upper valve; 7, pistil, stamens and lodicules. *All enlarged.*



PENNISETUM NATALENSE. *STAPF.*

NATAL PLANTS.

VOL. 2.

GRASSES.

, . . EDITED BY . . .

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—— AND OF ——

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1904.

PREFACE.

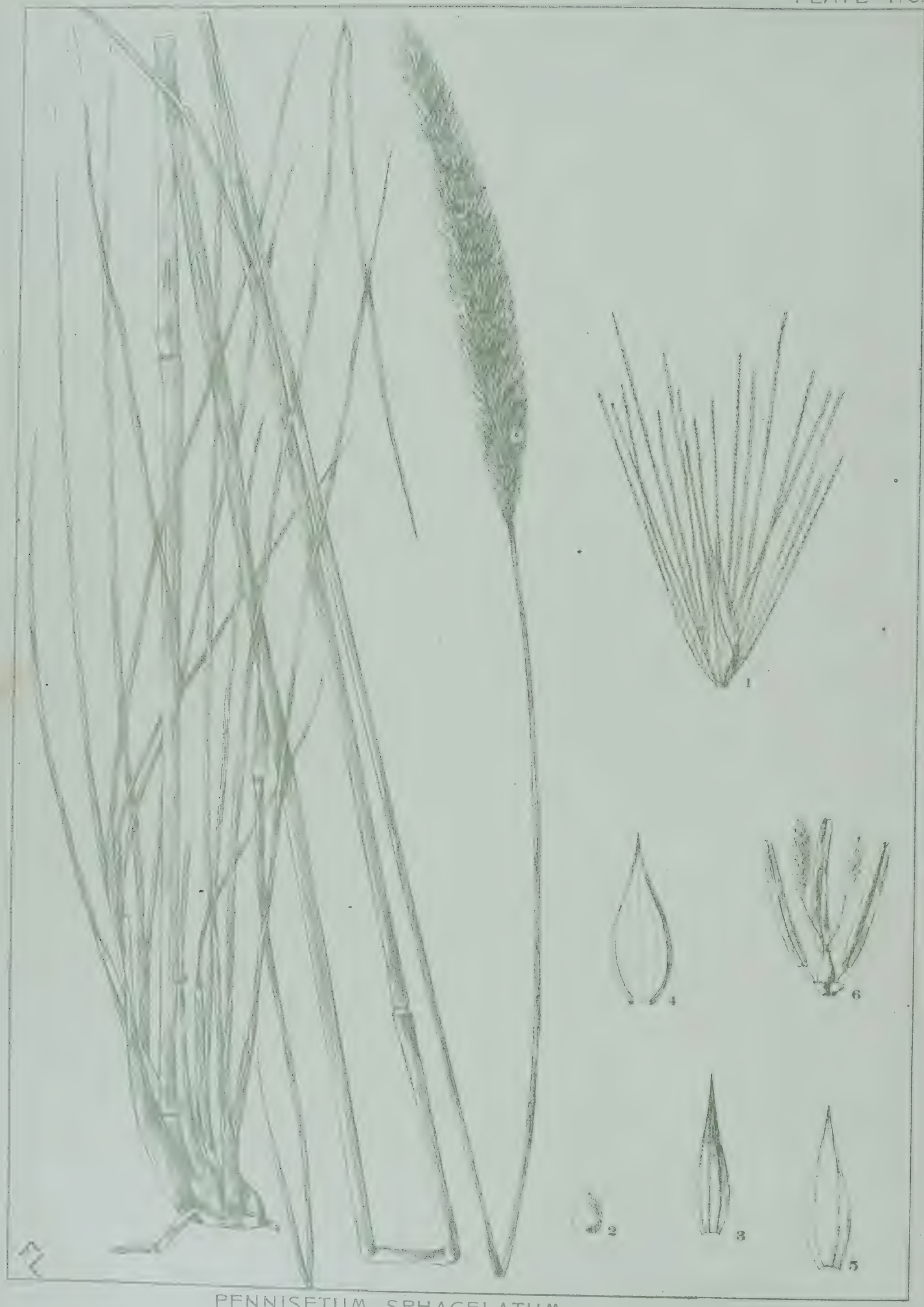
In presenting this volume of figures and descriptions of 100 of the Natal indigenous grasses, it is with pleasure that I acknowledge our great indebtedness to the Director of the Royal Gardens, Kew, for permission to use the descriptions of these plants as given in Vol. VII. of the Flora Capensis, since the descriptions here given are taken entire from that work, the only differences being the division into paragraphs, and the use of capitals and italics, with the object of making them easier of reference for those not accustomed to botanical descriptions. To Dr. Stapf, who has been responsible for the work on this difficult Order, our very hearty thanks are also due.

To the list of the habitats of the different species as given in the Flora Capensis, I have added those taken from the specimens in our Herbarium, and I regret that so very little local information could be given as to the value of the species as fodder or grazing plants, such information is not easily obtained in a country where the species, or but few of them, have any distinctive vernacular names, but it is hoped that the publication of this work will be of some assistance in the way of gathering information together for publication in a separate form. It will be noticed that there is a difference between the Plates Nos. 1 to 50, and those from 51 to 100, the first 50 were drawn on transfer paper, the second 50 were drawn on an enlarged scale with Indian ink, and then transferred to the stone by the photo-lithographic process, this was done by the advice of Mr. John Singleton, who has very successfully carried out the lithographic work, and to whom I am much indebted for the suggestion.

I have also to offer my thanks to all those persons who assisted by contributing specimens, and in some cases information also, to Mr. Mason for specimens collected in the Mooi River district, Mr. J. T. St. George for specimens collected near Maritzburg, and Messrs. Jenkinson and Swanfield for Zululand specimens. The set of specimens collected by the late Rev. John Buchanan, which is now in the Herbarium, has been of the greatest service, especially so as the numbers are so frequently referred to in the Flora Capensis. A number of specimens collected in the Dundee district by the late Mr. W. E. Green have also been very useful. The drawings and dissections were done in the Herbarium by Miss Lauth, and the drawings of the several parts have been compared, both with the plants and with Dr. Stapf's descriptions. At the end of the volume I note a few corrections of the details which were discovered on going over the drawings when the last part of the volume was completed.

In conclusion, it is necessary for me to state that, without the liberal grants allowed by Government for the different parts of this work as published, it would not be possible for it to be continued, except at such a loss as the Botanic Society would not be justified in accepting.

J. MEDLEY WOOD,
Director.



PENNISETUM SPHACELATUM. *DUR. & SCHINZ.*

PLATE 176.

PENNISETUM SPHACELATUM Durand & Schinz. (Fl. Cap., Vol. VII, p. 435).

Nat. Order Gramineæ.

PERENNIAL.—CULMS on a short oblique rhizome, slender, 1 to 3 feet high, about 3-noded simple, rough and pubescent or adpressedly hirsute below the panicle, otherwise glabrous and smooth, internodes mostly exserted, the uppermost often very long. Sheaths firm, lower crowded, short, at least on the innovation shoots, persistent, striate, glabrous, or pubescent along the margins and near the mouth; ligule a fringe of short silky hairs.

BLADES veary narrow, linear, filiform-convolute, 2 to 8 inches by $\frac{3}{4}$ to $1\frac{1}{2}$ lines, firm, flexuous, glabrous or hairy towards the base, rough in the upper part.

PANICLES cylindric, very dense, erect or nodding, 2 to 4 inches, by 3 to 4 lines, pallid or slightly purplish; rhachis slender, scabrid or pubescent like the very short pedicels; involucre of numerous pallid, slender, scabrid bristles of unequal length, the longer half as long again as the spikelet or longer, one usually longer and stouter than the rest.

SPIKELETS solitary, lanceolate, acuminate to subulate-acuminate, $1\frac{3}{4}$ to $2\frac{1}{2}$ lines long, glabrous, pallid, tips usually purplish.

GLUMES very small, *lower* often suppressed, obtuse or acute, hyaline, nerveless or upper 1-nerved. Florets equal or the lower which is reduced to an empty valve slightly shorter; valves oblong-lanceolate, subulate-acuminate, 5-nerved or the lower 3-nerved; lodicules sub-quadrate. Anthers about 1 line long, tips naked; styles connate at the very base.

Habitat: NATAL. Umsinga and the base of the Biggarsberg range, *Buchanan* 107; Reit Vlei, 4000 feet alt., *Buchanan* 171; and without precise locality, *Buchanan* 63, 72, 75; Van Reenen, 5000-6000 feet alt., March, *Wood* 5989; marshy ground Mooi River district, 4000 feet alt., December, *Mason* 50 (*Wood* 7322).

Drawn from Wood's 5989.

Fig 1, Spikelet; 2, upper glume; 3, lower valve; 4, upper valve; 5, pale; 6, pistil, stamens and lodicules. *All enlarged.*

PLATE 177.

PENNISETUM THUNBERGII, Kunth. (Fl. Cap., Vol. VII., p. 436).

Nat. Order Gramineæ.

PERENNIAL.—CULMS from a rather slender rhizome, ascending, conspicuously geniculate, slender, compressed below, $\frac{3}{4}$ to $1\frac{1}{2}$ foot long, about 2-noded, smooth, glabrous or pubescent below the panicle; upper inter-nodes exserted, uppermost often long.

LEAVES for the most part crowded at the base, glabrous except a hairy line at the junction of blade and sheath, rarely hairy all over, except towards the base of the sheaths. Sheaths firm, *lower* short, persistent, striate, keeled or ultimately rounded, *upper* long, loose or subtumid; ligule a dense silky fringe of short hairs.

BLADES linear, tapering to an acute point, 2 to 3 inches (rarely more) by 2 to 3 lines, keeled and folded or flat and involute, rigid, rather dull green, smooth except towards the tips and along the scaberulous margins.

PANICLE cylindric, very dense, erect, $1\frac{1}{4}$ to 2 inches, by 3 to 5 lines, purplish; rhachis scabrid; pedicels obsolete; involucres of very numerous and very fine scaberulous bristles, purplish above, of unequal length, the longer sometimes twice as long as the spikelet.

SPIKELETS solitary, oblong-lanceolate, $1\frac{1}{2}$ to 2 lines long, pallid, glabrous.

GLUMES, *lower* suppressed, *upper* very minute, hyaline, nerveless. Florets, *lower* reduced to an ovate acuminate 1 to 3-nerved valve of about half the length of the perfect floret and usually with a short fine bristle; fertile valve ovate-oblong, abruptly mucronate, acuminate, 5 to sub-7-nerved; lodicules 0 or very minute. Anthers about 1 line long, tips minutely bearded; styles almost free, although often more or less cohering.

Habitat: NATAL Van Reenen, 5000-6000 feet alt., December, *Wood* 7220; variety Galpinii, without precise locality, 4000 to 5000 feet alt., *Buchanan* 85.

Drawn from Wood's 7220, but the anthers had all fallen away.

Fig 1, Lower valve; 2, upper valve; 3, pale; 4, pistil and lodicules. *All enlarged.*

PENNISETUM THUNBERGII *KUNTH.*

PENNISETUM UNISETUM. *BTH.*

PLATE 178.

PENNISETUM UNISETUM, Benth. (Fl. Cap., Vol. VII., p. 437).

Nat. Order Gramineæ.

PERENNIAL.—Rhizome short, præmorse; innovation buds rather stout, acute, with firm, ovate, striate, ciliate scales.

CULMS 3 to 12 feet high, erect branched, particularly from upper nodes, or simple below, terete, or rarely semiterete in the lower and subtriquetrous in the uppermost internodes, very firm, obscurely striate, glabrous, glaucous, nodes 8 or more, longest internodes $\frac{1}{2}$ to 1 foot long; sheaths strong, the *lower* and middle as long as the internodes or shorter, ultimately spreading, the *upper* longer, tighter, glabrous except the usually ciliate mouth and the sometimes hairy nodes; ligules very short and ciliate or a fringe of hairs; blades lanceolate-linear from a usually long-narrowed base, or petioled, long tapering to a setaceous point, the longest from $\frac{1}{2}$ to $1\frac{1}{4}$ foot, by 3 to 10 lines, rather firm, glaucous, scabrid above, sometimes shortly and sparingly hairy, margins very rough.

RACEMES on long very slender peduncles, 1 or several from the upper nodes, sometimes very numerous, $\frac{1}{2}$ to 2 inches long; rhachis angular, scabrid.

SPIKELETS subimbricate, oblong or lanceolate-oblong, acute, $1\frac{1}{4}$ to $1\frac{1}{2}$ line long, often purplish, basal bristles $\frac{1}{2}$ to 10 lines long.

GLUMES reduced to a minute rounded or truncate nerveless scaberulous scales, *lower* $\frac{1}{6}$ to $\frac{1}{4}$, *upper* $\frac{1}{4}$ to $\frac{1}{2}$ line long; lower floret reduced to a valve minutely ciliate below the tip, otherwise scaberulous or almost smooth, firmly membranous, finely 5-nerved, margins obscurely inflexed in the upper third; upper valve similar to the lower, glabrous; pale almost as long as the valve, hyaline, 2-nerved; lodicules broadly cuneiform, fleshy, $\frac{1}{10}$ line long; anthers $\frac{3}{4}$ to $\frac{7}{8}$ line long; grain unknown.

Habitat: NATAL. Near Durban, in coffee gardens, *Drège*; Umpumulo, 1500 to 2000 feet alt., *Buchanan* 220, 221; Umhlanga, 3 to 500 feet alt., *Wood* 6059.

Drawn from Wood's 6059, and compared with Buchanan's 220, 221.

Fig 1, Spikelet; 2, lower valve; 3, upper valve; 4, pale; 5, pistil, stamens and lodicules. *All enlarged.*

SPIKELETS oblong, laterally compressed, more or less gaping, panicled. deciduous from capillary pedicels. Florets, *lower* usually male or barren, *upper* perfect. Glumes very dissimilar or at least unequal, *lower* reduced to a minute scale or obsolete, very rarely half the length of the spikelet, somewhat remote from the upper; *upper* one membranous, emarginate, muticous or finely mucronate or aristate from the sinus, 5-nerved, usually hairy. Valves very dissimilar, *lower* like the upper glume with a hyaline 2-nerved subequal pale, *upper* much smaller, thinly chartaceous, glabrous, shining, obtuse or sub-emarginate, obscurely 5-nerved, with an equal 2-nerved pale of similar substance. Lodicules 2, very small. Stamens 3. Style free, slender; stigma densely plumose, laterally exserted. Grain oblong-ellipsoid, closely embraced by the valve and pale; hilum basal, punctiform; embryo about half the length of the grain.

PLATE 179.

TRICHOLÆNA SETIFOLIA, Stapf. (Fl. Cap., Vol. VII., p. 442).

Nat. Order Gramineæ.

CULMS in compact tufts, with numerous intravaginal innovation shoots, erect or geniculate, $\frac{3}{4}$ to $1\frac{1}{2}$ foot long, rather slender, glabrous, 2 to 3-noded, upper internodes more or less exserted

LEAVES mostly crowded at the base; *lower* sheaths compressed, keeled, firm, striate, hairy to tomentose, at least towards the base and the margins (hairs spreading or adpressed) at length often glabrescent, persistent, *upper* glabrous except at the villous nodes; ligule a dense fringe of very short hairs.

BLADES filiform, setaceously convolute, flexuous, 4 to 8 inches (rarely 12 inches) long, glabrous or hairy.

PANICLE contracted, linear, often spike-like, usually flexuous or nodding, 2 to 4 inches long, silky; rhachis slender, scabrid or hairy in the upper part and below the nodes; branches solitary or 2-nate, filiform, flexuous, loosely divided almost from the base, erect, like the subcapillary branchlets and pedicels, usually dark and finely hairy, tips slightly thickened with slightly longer hairs.

SPIKELETS oblong, 2 to $2\frac{1}{2}$ lines wide, very densely villous with shining white or purple hairs, bearded at the base.

GLUMES, *lower*, oblong obtuse, less than $\frac{1}{2}$ inch long, hyaline, quite hidden by hairs; *upper* equalling the spikelet, subchartaceous, oblong, minutely emarginate with a mucro or short awn from the sinus, 5-nerved, densely villous with the hairs increasing in length from the base to beyond the middle, then glabrous towards the apex except along the ciliate margins, hairs usually adpressed and exceeding the spikelet by 1 to $1\frac{1}{2}$ lines. Florets, *lower* male or barren; valve equal and very similar to the upper glume; pale hairy; perfect floret oblong to linear-oblong, 1 to $1\frac{1}{4}$ line long, glabrous, shining; valve obtuse, subemarginate, faintly 5-nerved, membranous; anthers $\frac{3}{4}$ line long.

Habitat: NATAL. At the foot of Table Mountain, *Krauss* 382; by the Umhloti River at Oakford, *Rehmann*, 8456; Biggarsberg Range, *Rehmann* 7036; Inanda, *Wood* 1595; Pietermaritzburg, 2000-3000 feet alt., *Sutherland*; Umpumulo, *Buchanan* 298, in part; and without precise locality, *Buchanan* 86; Durban Flat, 20 feet alt., *Wood* 8953; Dundee, 4000-5000 feet alt., December, *Green* 69.

Fig 1, Lower glume; 2, lower valve; 3, pale; 4, upper valve; 5, pale; 6, pistil, stamens and lodicules. *All enlarged.*

TRICHOLAENA = TIFDLIA STAPF

TRICHOLAENA ROSEA. Nees

PLATE 180.

TRICHOLÆNA ROSEA, Nees. (Fl. Cap., Vol. VII., p. 443).

Nat. Order Gramineæ.

PERENNIAL OR ANNUAL.—CULMS laxly fascicled, rarely densely tufted, usually geniculate, 1 to 1½ foot long, simple or scantily branched below, terete, glabrous or sometimes hirsute from tubercle-based hairs, 3 to 4-noded. Sheaths terete or the lower slightly compressed, glabrous except at the villous nodes or hirsute from usually tubercle-based hairs, 3 to 4-noded. Sheaths terete, or the lower slightly compressed, glabrous except at the villous nodes, or hirsute from usually tubercle-based hairs.

BLADES linear, long tapering to a subsetaceous point, 2 to 8 inches by 1 to 4 lines, rarely broader or narrower, flat, often spreading and rather flaccid, rarely convolute, glabrous or sometimes scantily hairy, rough above.

PANICLE oblong to ovoid, lax or contracted, 3 to 6 inches long, straight or flexuous; rhachis slender, finely scaberulous; branches fascicled or 2-nate, finely filiform, undivided below or laxly branched almost from the base; branchlets and pedicels finely capillary, flexuous, glabrous or more or less hairy, scaberulous, tips thickened with long fine hairs (up to 2 lines long).

SPIKELETS oblong, about 2 lines long, villous from shining white or purple hairs, shortly bearded at the base.

GLUMES, *lower* oblong, obtuse, about ½ line long, hyaline, almost hidden by hairs; *upper* equalling the spikelet, semi-ovate, more or less gibbous below the middle and slightly narrowed into an oblong beak, obtusely 2-lobed or emarginate, with or without a mucro or a short fine awn from the sinus, subchartaceous, often olive-brown, villous with the hairs increasing in length from the base to beyond the middle, then glabrous except the ciliate margins; hairs often springing from minute or sometimes coarse and partly confluent tubercles, adpressed or sometimes spreading, usually exceeding the tips of the glume. Florets, *lower* male or barren; valve equal and very similar to the upper glume; pale more or less hairy. Perfect floret 1¾ line long, elliptic-oblong, obtuse, glabrous; valve emarginate, faintly 5-nerved, membranous. Anthers over ¾ line long. Grain obovoid, brown, ¾ line long.

Habitat: NATAL. Near Durban, *Plant* 98; Drakensberg, *Rehmann* 7175; near Umpumulo and Reit Vlei, common, *Buchanan* 298, in part; without precise locality, *Gerrard* 461; *Buchanan* 122; Berea, February, *Wood* 8881; Berea, September, *Wood*, 9042.

A common grass all over the Colony, seeds have been sent to India and other places, and it is thought to be a good fodder grass, but in Natal it does not seem to be much esteemed. It is known abroad as the "Natal Red-top Grass," but it is also found in Transvaal and Cape Colony. The native name is um-Kuana.

Fig 1, Lower valve; 2, pale; 3, upper valve; 4, pale; 5, pistil, stamens and lodicules. *All enlarged.*

PLATE 181.

TRICHOLÆNA GLABRA, Stapf. (Fl. Cap., Vol. VII., p. 446).

Nat. Order Gramineæ.

PERENNIAL —CULMS densely fascicled, erect or subgeniculate, slender, branched and wiry below, 1 to 1½ foot long, glabrous, smooth, 5 to 7 noded; *upper* internodes at length exserted; sheaths tight, terete, striate, *lower* subpersistent, often finely hairy; ligule a dense fringe of fine hairs; blades linear, long tapering to a fine point, 2½ to 4½ inches by 1 to 2½ lines, flat or involute, somewhat rigid and glaucous, finely pubescent or glabrous, smooth.

PANICLE oblong or obovoid, open or contracted, lax, 2½ to 6 inches long; rhachis slender, smooth; branches filiform, smooth, 2-nate or solitary, the longest 2 to 4 inches long, very laxly and repeatedly divided from the base, or the strongest simple, for ½ to 1 inch; branchlets and pedicels very delicate, capillary, flexuous, the latter 1 to 2 lines long.

SPIKELETS elliptic-oblong, 1 line long, glabrous, pallid or tinged with purple.

GLUMES, *lower* an extremely minute scale, *upper* oblong, almost equalling the spikelet, emarginate, membranous, faintly 5-nerved. Florets, *lower* male; valve very similar to the upper glume, but slightly longer and broader; pale equal to the valve, glabrous. Perfect floret oblong, ⅔ line long, valve rigidly membranous, shining, obscurely 5-nerved. Anthers ½ to ⅝ line long.

Habitat: NATAL. Sandy valley near the Tugela River, 1000 feet alt., *Buchanan* 259; Helpmakaar Spruit, Potgieter's Rust, (in Natal), *Nelson* 23.

Drawn from Buchanan's 259, which is the only specimen in the Herbarium.

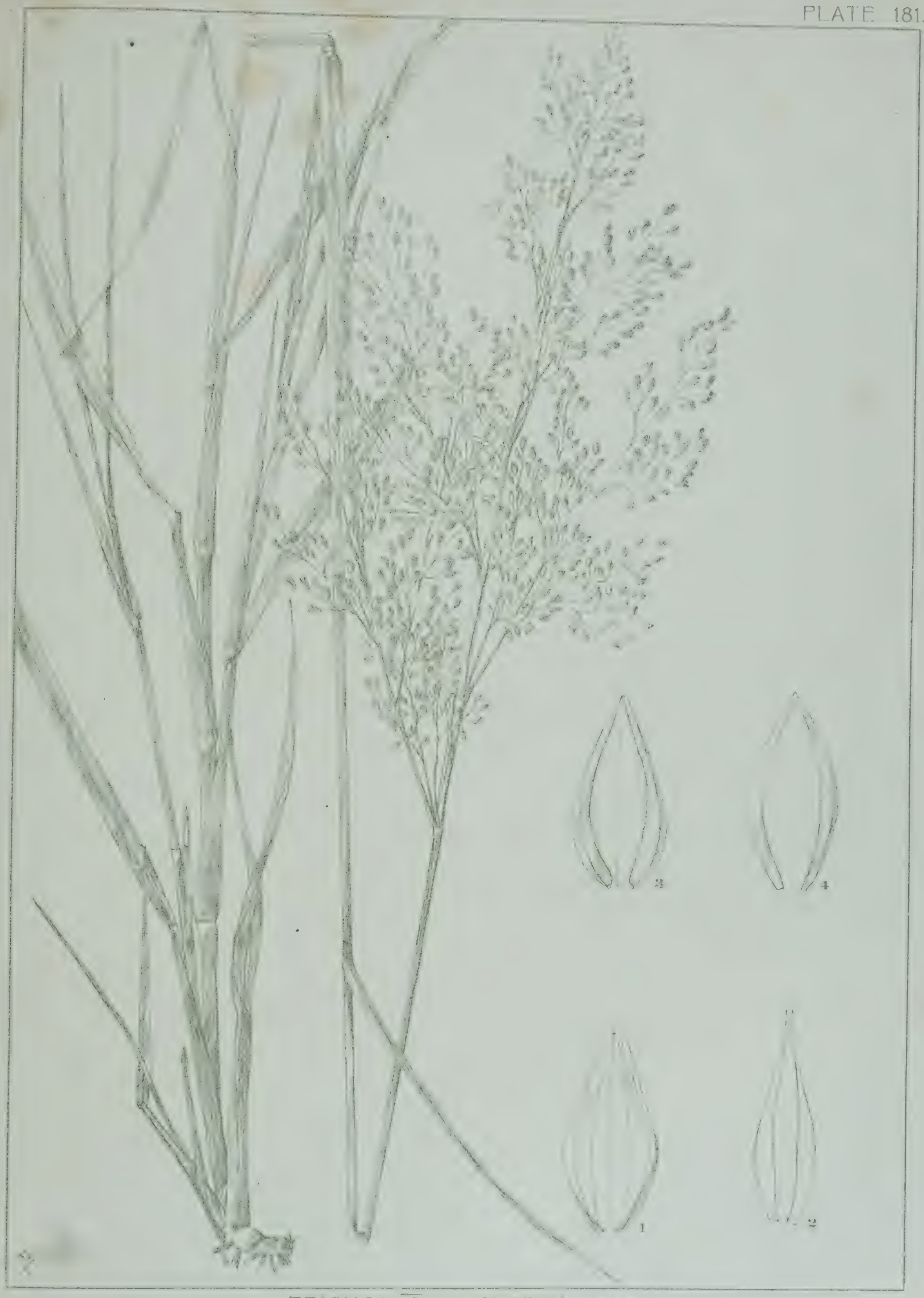
Fig 1, Lower valve; 2, pale; 3, upper valve; 4, pale. ***All enlarged.***

MELINIS, BEAUV.

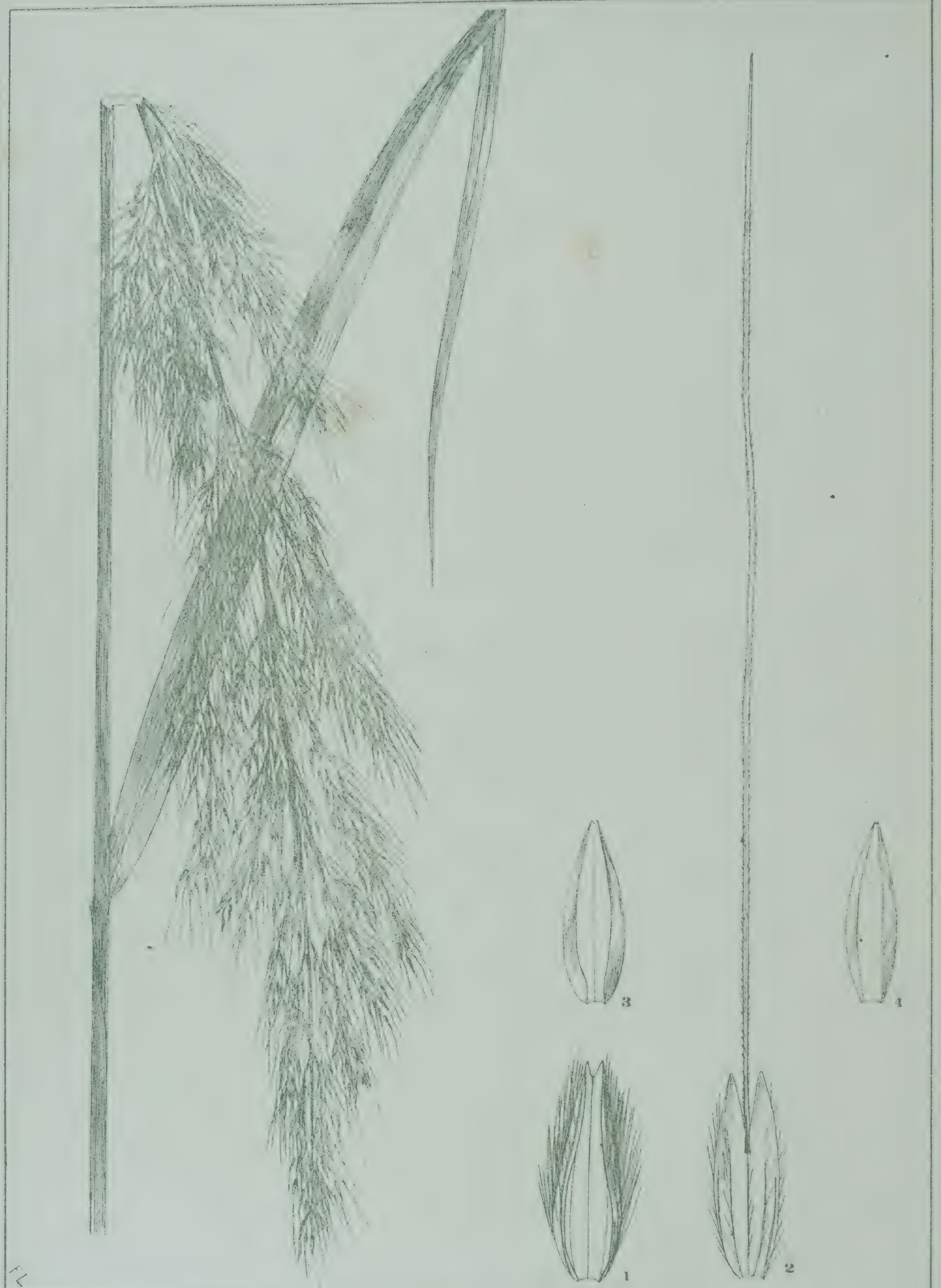
SPIKELETS linear-oblong, small, laterally compressed, panicled, deciduous from the capillary pedicels; *lower* floret reduced to an empty valve; *upper* perfect. Glumes very dissimilar, *lower* reduced to a minute scale, *upper* membranous, shortly 2-lobed, mucronulate from the sinus, prominently 7-nerved, glabrous, rarely hairy. Valves very dissimilar; *lower* rather like the upper glume, but more deeply lobed and usually with a fine awn from the sinus, 5-nerved; *upper* smaller, very thin and rigidly membranous, minutely 2-lobed, shining, obscurely 3-1-nerved with an equal, obscurely 2-nerved pale of similar substance. Lodicules 2, very delicate. Stamens 3. Styles free, slender; stigmas plumose, laterally exserted. Grain unknown.

PERENNIAL OR ANNUAL (?)—CULMS ascending from a prostrate, very slender, many noded, branched base; ligules reduced to a fringe of short hairs; panicle contracted, narrow, much divided, with capillary branchlets and pedicels; spikelets usually purple, at least at the tip.

Species 1, in Brazil, tropical and subtropical Africa and Madagascar. Very closely allied to Tricholæna.



TRICHOLAENA GLABRA



MELINIS MINUTIFLORA, *BEAUV.*

Var: Pilosa, Stapf.

PLATE 182.

MELINIS MINUTIFLORA, Beauv. var pilosa, Stapf. (Fl. Cap., Vol. VII., p 447).

Nat. Order Gramineæ.

PERENNIAL OR ANNUAL (?)—CULMS 1 to 3 feet high, more or less hirsute except at the upper nodes.

LEAVES loosely hirsute to tomentose; sheaths tight, terete, striate, finely tubercled; blades linear to linear-lanceolate, long tapering to a very fine point, 2 to 6 inches by $2\frac{1}{2}$ to $4\frac{1}{2}$ lines, rather rigid, flat or involute.

PANICLE linear to linear-oblong, contracted or almost spike-like, 4 to 8 inches long, erect, stiff or rather flexuous; rhachis slender, angular, smooth below; branches 2-nate or the lower in scanty fascicles, erect, up to 3 inches long, distantly and repeatedly divided from the base; branchlets and pedicels capillary, flexuous, puberulous, the latter very unequal, up to almost 2 lines long, with or without white, stiff, fine hairs below the tips.

SPIKELETS 1 line long, very minutely bearded at the base.

GLUMES, *lower* very minute, oblong, obtuse, nerveless, *upper* equalling the spikelet, linear-oblong, like the lower valve, more or less hairy above the base, hairs white, very fine; awn of the lower valve very slender, scaberulous, up to 4 lines long. Perfect floret $\frac{7}{8}$ line long, glabrous. Anthers $\frac{1}{2}$ line long.

Habitat: NATAL. Near Umpumulo hills, 2000 to 2500 feet alt., *Buchanan* 299.

Also in Nyassaland and on Mount Ruwenzori.

The typical form, which is very common in Brazil, and occurs also in tropical Africa and Madagascar, only differs in being completely glabrous, and in the occasional absence of awns.

Fig 1, Upper glume; 2, lower valve; 3 upper valve; 4, pale. *All enlarged.*

ARUNDINELLA, RADDI.

SPIKELETS small, $2\frac{1}{2}$ lines to less than 1 line long, acute or acuminate, panicled, continuous with or imperfectly jointed on the pedicels; rhachilla disarticulating between the valves, glabrous, not produced beyond the upper floret. Florets 2, heteromorphous, *lower* male, rarely barren or perfect, *upper* perfect. Glumes persistent, acuminate, membranous, strongly 3-5-nerved, *upper* usually longer. *Lower* valve thin, equalling the lower glume or slightly longer, subacute or minutely truncate, 3-7-nerved; *upper* valve terete, rarely dorsally subcompressed, thin, finally cartilaginous, entire or minutely bifid, 3-7-nerved, minutely scaberulous, lobes sometimes produced into fine bristles; awn terminal or from between the lobes, short, kneed or straight, or 0; callous very short, obtuse. Pales linear, 2-keeled; flaps more or less auricled. Lodicules 2, cuneate, rather fleshy or 0 in the lower floret. Stamens 3 or 0 in the lower floret. Ovary glabrous, oblong or more or less arrested or 0 in the lower floret; styles distinct; stigmas plumose, laterally exserted. Grain oblong to ellipsoid, terete or dorsally subcompressed, tightly embraced by the valve and pale, free; hilum punctiform; embryo large; albumen hard.

PERENNIAL, rarely annual; leaves various; panicles usually rather stiff; branches stiff, divided from the base.

About 25 species, mainly in tropical Asia and America.

PLATE 183.

ARUNDINELLA ECKLONII, Nees. (Fl. Cap., Vol. VII., p. 448).

Nat. Order Gramineæ.

PERENNIAL.—CULMS erect, $2\frac{1}{2}$ to 4 feet long, glabrous, 4 to 6-noded; sheaths rather tight, glabrous or ciliate along the margins or hirsute; ligules extremely short, ciliolate, blades linear, tapering to a long fine point, from a few inches to more than 1 foot, by 2 to 4 lines, flat or convolute, rigid, glabrous, margins rough.

PANICLE linear-oblong to oblong, contracted or open, up to 1 foot long; branches solitary or 2, rarely 3-4-nate, the longest up to 3 inches long, stiff, scabrid.

SPIKELETS subsecund, 2 to $2\frac{1}{2}$ lines long.

GLUMES, *lower* ovate-oblong, mucronate, $1\frac{1}{2}$ to 2 lines long, 3, rarely 4-5-nerved; *upper* ovate-lanceolate, 2 to 5 lines long, 5-nerved. Florets, *lower* male; valve linear-oblong, subacute, $1\frac{3}{4}$ to 2 lines long, sub-7-nerved; pale linear-oblong, $1\frac{1}{2}$ line long, keels winged below, scaberulous above; lodicules present; anthers $\frac{3}{4}$ line long. Perfect floret; valve oblong, obscurely bifid, $1\frac{1}{2}$ line long, thin, minutely scaberulous; callus minutely 2-bearded; awn fine, column dark brown, $1\frac{1}{2}$ line long, bristle whitish, 1 line long; pale linear, $1\frac{1}{4}$ line long, scaberulous between the keels; lodicules and stamens as in the male floret.

Habitat: NATAL. On the banks of rivulets between Umzimkulu River and Umkomaas River, *Drège*; Riet Vlei, 4000-5000 feet alt., *Buchanan* 275; Umpumulo, near water, 2000 feet alt., *Buchanan* 274; and without precise locality, *Gerrard* 684, 685; summit of Drakensberg, near Nelson's Kop, March, *Wood* 6003, alt. 5000-6000 feet; Dundee, March, *Green* 82; Zululand, 2000 feet alt, *Jenkinson* 96.

Jenkinson says of this grass: "Good for cattle, grows in scattered tufts."

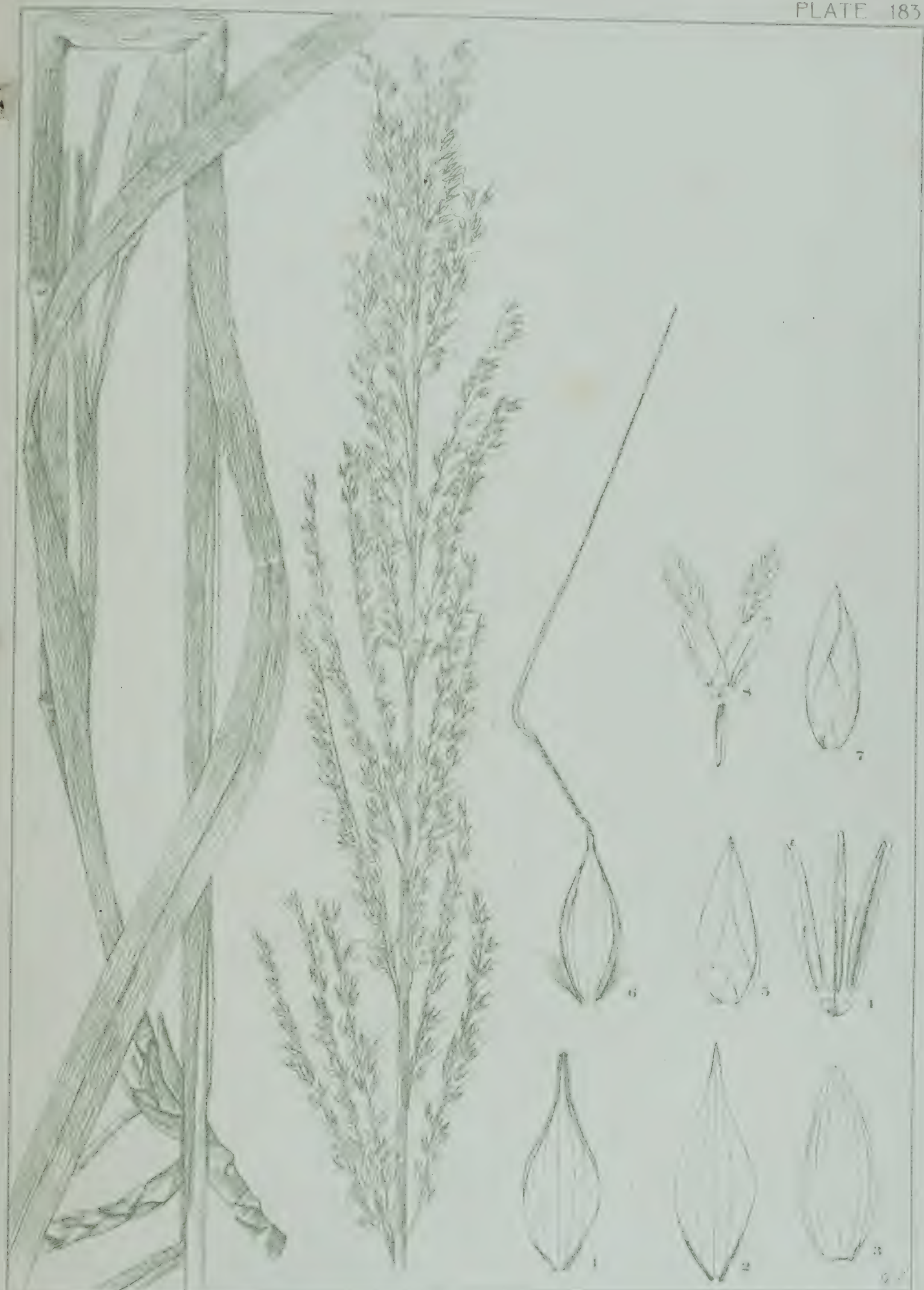
Fig. 1, Lower glume; 2, upper glume; 3, lower valve; 4, stamens and lodicules; 5, pale; 6 upper valve; 7, pale; 8, pistil, stamens and lodicules. *All enlarged.*

STENOTAPHRUM, TRIN.

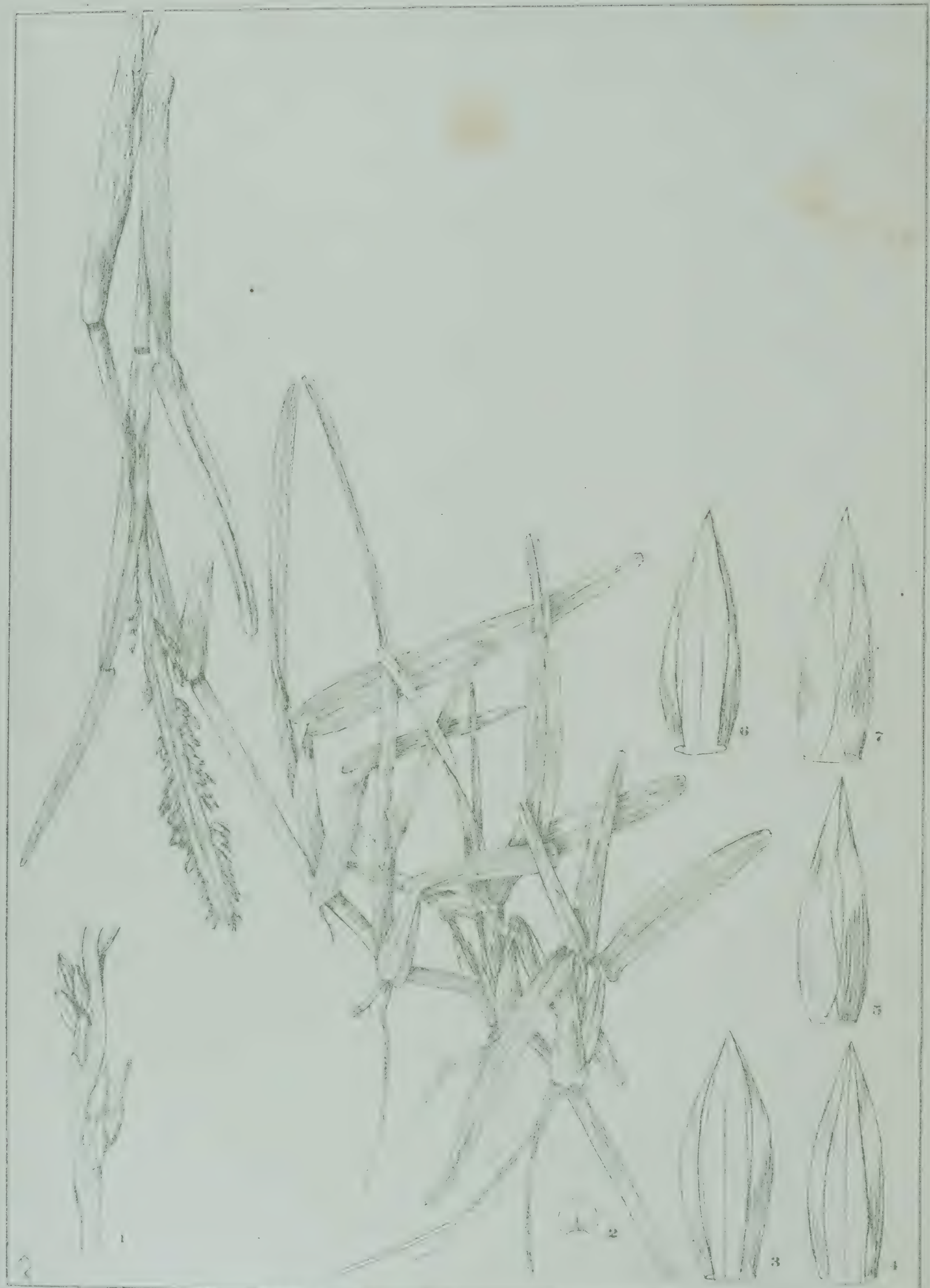
SPIKELETS lanceolate to ovate-oblong, sessile, singly or 2-4 on the very short branches of an apparently simple secund spike, more or less sunk in hollows on or adpressed to the anterior face of a dorsally flattened herbaceous, continuous or jointed rhachis. Florets, *lower* male, or reduced to an empty valve; *upper* perfect. Glumes usually very dissimilar, *lower* minute, hyaline, *upper* almost equalling the spikelet, 5-7-nerved, rarely both more or less similar and minute, or the lower nerved like the upper, although smaller. Valves equal, *lower* (outer) firm, chartaceous, 3-9-nerved, *upper* thinner 5-nerved. Pales almost equalling the valves, 2-keeled. Lodicules 2, obliquely quadrate, nerved. Stamens 3. Styles free or almost so, very slender; stigmas long, plumose, laterally exserted. Grain broadly elliptic-oblong, slightly compressed from the back, tightly enclosed; hilum punctiform, basal; embryo about half the length of the grain.

Creeping or prostrate branched perennials with ascending culms; sheaths strongly compressed, *lower* more or less flabellate; blades mostly obtuse; spikes terminal and often also lateral from the upper leaves, tough or at length breaking up at the joints.

Species 5, mainly on the shores of the tropical and subtropical seas.



ARUNDINELLA ECKLONII · *NEES.*



STENOTAPHRUM GLABRUM

PLATE 184.

STENOTAPHRUM GLABRUM, Trin. (Fl. Cap., Vol. VII., p. 438).

CULMS ascending, prostrate or creeping and frequently rooting at the nodes, often very long, strongly compressed, glabrous, smooth, many-noded.

LEAVES glabrous or more or less hairy at the mouth of the sheath or at its junction with the blade, *lower* crowded at the base of the branches, more or less flabellate, followed often by a pseudo-opposite pair of and 2-4-distant leaves; sheaths strongly compressed, keeled, pallid, soon thrown aside, *lower* persistent; ligule a fringe of very short hairs; blades linear, obtuse, 1 to 6 inches by 1 to 3 lines, first folded, then flat or at length involute, rather firm, glaucous or light green, smooth; false spikes terminal and lateral from the upper leaves, erect, stiff or curved, 1 to 4 inches long, compressed, glabrous; rhachis linear, entire, 1 to $2\frac{1}{2}$ lines broad, with or without transverse depressed lines on the back indicating the joints, often hollowed out in front; branches very short, more or less sunk in the hollows or adpressed to the margin of the rhachis, compressed or angular, often very stout.

SPIKELETS solitary from the inner side of the base of the branch, sunk in the adjoining hollow, or 2 to 5 crowded along the branch, lanceolate-oblong to oblong, acute, $2\frac{1}{2}$ lines long, pallid.

GLUMES, *lower* hyaline, very short, broad, truncate, nerveless, *upper* ovate-oblong, concave, almost as long as the spikelet, 7-nerved, firmly membranous. Florets, *lower* male; valve lanceolate-oblong to oblong, acute, equalling the spikelet, chartaceous, faintly 7 to 9-nerved, dorsally flattened, somewhat rough. Anthers $1\frac{1}{4}$ to $1\frac{1}{2}$ line long; *upper* floret perfect; valve similar to the lower, but more acute, firmly membranous, 5-nerved.

Habitat: NATAL. Durban Flat, *Buchanan* 16; without precise locality, *Gerrard* 678; Zululand, 2000 feet alt., January, *Jenkinson* 60 (*Wood* 9059); Umsinga, *Buchanan* 98. Also in Cape Colony by numerous collectors.

Drawn from Jenkinson's 60, and compared with Buchanan's 98.

Of this genus five species only are known, the one here described is not uncommon near the sea coast in tropical countries, it has been described under seven different names in addition to the correct one as given here, one of these names is *S. Americanum*, Schrank, and in a work on North American grasses published by the United States Department of Agriculture it is said of it: "This grass grows in sandy soil, especially near the sea coast. It has strong creeping roots, which render it capable of enduring great drought. It has been recommended in Florida as a very valuable pasture grass." The specimen from which our drawing was made was a rather imperfect one.

Mr. Jenkinson says of this grass: "A running grass, used for lawns Seeds eaten by natives in time of famine."

Fig 1, Portion of rhachis with spikelets; 2, lower glume; 3, upper glume; 4, lower valve; 5, pale; 6, upper valve; 7, pale. *All enlarged.*

SPIKELETS usually 2-18 lines long, more or less lanceolate to linear, pedicelled, panicled. Rhachilla disarticulating between (and less readily below) the valves, glabrous, not produced beyond the upper floret. Florets 2, heteromorphous; *lower* male, rarely barren; *upper* perfect. Glumes persistent, membranous or subcoriaceous, unequal, 3 (very rarely 4-6) nerved, glabrous or bristly from black glands. *Lower* valve membranous, 3 (very rarely 7) nerved, with the innermost side-nerves much shorter; *upper* valve terete, membranous to cartilaginous, shortly bifid with the lobes sometimes produced into bristles, 5-9-nerved; awn from between the lobes, kneed, twisted below. Pales membranous, 2-keeled, narrower in the perfect floret and channelled between the stout keels. Lodicules 2, cuneate, usually very fleshy. Stamens 2, rarely 3, or 0 in the lower floret. Ovary oblong, glabrous, rudimentary in the male floret; styles distinct, glabrous, stigmas plumose, long, laterally exserted. Grain obovoid to linear-oblong, grooved or almost terete, tightly embraced by its valve and pale, free; hilum linear, long; embryo large; albumen very hard.

PERENNIAL, rarely annual grasses of very different habit; leaves more or less rigid; ligules a line of hairs; spikelets slender, from 2 lines to $1\frac{1}{2}$ inch long, scattered in mostly contracted, narrow panicles.

PLATE 185.

TRICHOPTERYX SIMPLEX, Hack. (Fl. Cap., Vol. VII., p. 450).

Nat. Order Gramineæ.

Densely tufted.—CULMS 2 to 3 feet long, glabrous, 2 (rarely 3) noded.

LEAVES all but 2 or 3 near the base, sheathing the culms to $\frac{1}{2}$ foot; sheaths firm, tight, glabrous or more or less hispid, bearded at the nodes, the lowest tomentose at the base and finally splitting into rigid fibres; blades narrow-linear, tapering to a long setaceous point, $\frac{1}{2}$ foot by 2 lines or less, flat or convolute, rigid, hirsute or glabrescent.

PANICLE erect, contracted, 6 to 10 inches long; rhachis glaucous; branches fascicled or geminate, erect, very unequal, the longest to 2-3 inches long, filiform, sparingly branched, scabrid or almost smooth

SPIKELETS light brown, 5 to 6 lines long.

GLUMES glabrous, rarely sparingly bristly, the *lower* lanceolate-oblong, minutely subtruncate, $2\frac{1}{2}$ to 3 lines long, the *upper* lanceolate, produced into a linear convolute truncate beak, 5 to 7 lines long. Florets, *lower* male; valve lanceolate, acute or acutely acuminate, usually shorter than the upper glume, glabrous, or with a very few bristles along the outer nerves; pale linear-oblong, $3\frac{1}{2}$ lines long. Stamens 2, anthers $1\frac{1}{2}$ to 2 lines long. Perfect floret; valve oblong-linear, terete, $2\frac{1}{2}$ to 3 lines long (in this and the following species measured from the callus to the base of the awn), pubescent, faintly 7-nerved, shortly bifid; lobes acute; callus 2-toothed, villous, bearded, $\frac{1}{2}$ line long; column of awn 4 to 5 lines long; bristles 9 to 15 lines long; pale lanceolate, acute, 3 lines long. Stamens as in the male.

Habitat: NATAL. Umpumulo, *Buchanan* 294; var crinita, Umpumulo, *Buchanan* 293; Inanda, 1800 feet alt., *Wood* 1580; South Downs, 4000-5000 feet alt., *Wood* 4404; Karkloof, 4000 feet alt., *Wylie* (*Wood* 6011); Lidgetton, 4000 feet alt., *Wood* 9095. Also in Transvaal, Pondoland, and tropical Africa

Fig 1, Typical plant; 2, lower glume; 3, upper glume; 4, lower valve; 5, pale; 6, upper valve; 7, pale, ovary and lodicules; 8, branchlet of var crinita. *Except Fig 1, all enlarged.*

TRICHOPTERYX SIMPLEX. *HACK*

TRICHOPTERYX DREGEANA. *NEES.*

PLATE 186.

TRICHOPTERYX DREGEANA, Nees. (Fl. Cap., Vol. VII., p. 451).

Nat. Order Gramineæ.

CULMS ascending or erect from a slender creeping rhizome, branched below, 1 to 2 feet high, very slender, glabrous, many-noded, internodes exserted.

LEAVES equally distributed over the culms; sheaths tight, glabrous; blades narrowly linear, tapering to an acute point, usually involute, somewhat subulate, reflexed, $\frac{3}{4}$ to $1\frac{1}{4}$ line long, glabrous, margins cartilaginous.

PANICLE narrow, 1 to 3 inches long, flaccid or erect and flexuous, contracted or open; rhachis filiform; branches 2-3-nate, capillary, almost smooth, branched from below the middle, up to 1 inch long, tips of pedicels with long fine hairs.

SPIKELETS light brown, 2 to 3 lines long.

GLUMES, *lower* ovate, subacute or obtuse, $1\frac{1}{4}$ to $1\frac{1}{2}$ line long, glabrous, thin, *upper* lanceolate acuminate, acute, 2 to $2\frac{1}{2}$ lines long. Florets, *lower* male; valve like the upper glume, slightly longer; pale linear-oblong $1\frac{1}{2}$ line long. Stamens 2, anthers $\frac{1}{2}$ line long. Perfect floret; valve oblong 1 line long, deeply bifid, lobes produced into fine bristles $1\frac{1}{2}$ line long, glabrous except a long beard on each side at the middle, sub-7-nerved; callus minute, obtuse, minutely bearded; awn very fine, 3 lines long, column very short; pale $1\frac{1}{2}$ line long; stamens 2.

Habitat: NATAL Common on wet banks, *Buchanan* 291; between Umtentu and Umzimkulu Rivers, 500 feet alt., *Drège*; Zululand, in a swamp at Entumeni, *Wood* 3995.

Also in Transvaal and Shire Highlands.

In the description in the Flora Capensis the leaves are said to be $\frac{3}{4}$ to $1\frac{1}{4}$ line long, this is evidently a printer's error, it should be $\frac{3}{4}$ to $1\frac{1}{4}$ line wide.

Fig 1, Lower glume; 2, lower valve; 3, pale; 4, stamens; 5, upper valve; 6, pale; 7, ovary, style, stamens and lodicules. *All enlarged.*

TRISTACHYA, NEES.

SPIKELETS 5 lines to 2 inches long, lanceolate to linear, sessile or shortly pedicelled, in clusters of 3 at the tips of the branches of a raceme or panicle; rhachilla disarticulating between the valves and less readily or imperfectly below them, glabrous, not produced beyond the upper floret. Florets 2, heteromorphous, *lower* male, *upper* perfect. Glumes persistent, membranous or subcoriaceous, more or less unequal, 3-nerved, glabrous or bristly from black glands. *Lower* valve membranous, 3-nerved, or 5-9-nerved with some of the nerves much shorter than the others; *upper* valve convolute, membranous or ultimately cartilaginous, bifid, 7 (rarely 5-) nerved, awned from between the lobes; awn kneed, twisted below. Pales membranous, hyaline, 2-keeled. Lodicules 2, cuneate, very fleshy. Stamens 3. Ovary obovoid to oblong, glabrous or the top, hairy, rudimentary in the male floret; stigmas plumose, long, laterally exserted. Grain obovoid to linear-oblong, grooved, tightly embraced by the valve and pale, free; hilum linear, long; embryo large; albumen very hard.

PERENNIAL, generally coarse grasses, growing mostly in compact tufts. Leaves rigid; ligule a line of hairs; triplets of spikelets large and few in racemes, or smaller and more numerous in scantily branched panicles, sometimes deciduous from the jointed peduncles.

Species 11-12, in Africa, Arabia, and Beluchistan, and in tropical America.

PLATE 187.

TRISTACHYA LEUCOTHRIX, Trin. (Fl. Cap., Vol. VII., p. 453).

Nat. Order Gramineæ.

CULMS 1 to 2 feet long, glabrous, 2 (rarely 1-) noded.

LEAVES mostly basal; lowest sheaths very firm, rigid, persistent, fulvously tomentose below, glabrescent above, *upper* rather tight, sparsely hairy or glabrous; nodes villous; blades linear, tapering to a fine point or acute, 6 to 9 inches, by $1\frac{1}{2}$ to 2 lines, uppermost much shorter, rigid, glabrous and smooth, or sparsely hairy, rarely hispidly villous; triplets of spikelets 1 to $1\frac{1}{4}$ inch long, 5-3 in racemes, rarely 2 or solitary. Peduncles $\frac{1}{2}$ to $1\frac{1}{2}$ inch long, flexuous, glabrous and smooth or hispid above; pedicels very short, stout or hardly any.

GLUMES, *lower* lanceolate, acute or subulate-acuminate, 9 to 12 lines long, firm, 3-nerved, with long white soft spreading hairs from closely crowded small tubercles along the nerves; *upper* lanceolate, long subulate-acuminate, 14 to 18 lines long, scarious, 3-nerved, minutely tubercled and spreadingly hairy along the margin. Florets, *lower* male; valve similar to the upper glume, but slightly longer, 7-nerved, side nerves close to the margins with a double row of bristle bearing glands on each side; pale linear-oblong, 7 to 8 lines long; keels narrowly winged below, minutely ciliolate above. Anthers $3\frac{1}{2}$ lines long. Perfect floret; valve lanceolate, $4\frac{1}{2}$ lines long, bifid to $\frac{1}{3}$ its length, glabrous, 7-nerved, lobes lanceolate, acuminate; callus pungent, $1\frac{1}{2}$ line long, villous; awn yellowish, 2 to 3 inches long, obscurely geniculate; pale linear-oblong, 5 to 6 lines long, keels almost smooth. Ovary obovoid, villous except at the base; styles pubescent; grain linear-oblong, 3 to $3\frac{1}{2}$ lines long.

Habitat: NATAL. On the summit of Table Mountain near Pietermaritzburg, *Krauss* 366; Inanda, *Wood* 1594; Umpumulo and Riet Vlei, *Buchanan* 237, and without precise locality, *Buchanan* 59; Zululand, *Jenkinson* 30; Dundee, *W. E. Green* 110, partly.

Also in Cape Colony, Transvaal and tropical Africa.

In the report of the Cape Botanist for 1864, this grass is alluded to, and is said to be known as "Roode Zaad Gras," and Mr. Ella, of Queenstown district, says of it: "Said to be a good sound pasture, standing and eatable when all others have been blown into dust, it does not stand frost, nor does it shoot early in spring, nor does it grow readily without moisture, but from its permanency when once matured it may be said to be the most important of the district."

Fig. 1, Lower glume; 2, upper glume; 3, lower valve; 4, pale; 5, stamens and lodicules; 6 upper valve; 7, pale; 8, pistil, stamens and lodicules. *All enlarged.*

TRISTACHYA LEUCOTHRIX. *TRIN.*

ANTHOXANTHUM ECKLONII. *Stapf*

Anthoxanthum, Linn.

Spikelets oblong to narrow-lanceolate, slightly laterally compressed ; rhachilla disarticulating above the upper glume, not produced beyond the uppermost floret. Florets 3, heteromorphous, the *lower* two male or barren, the terminal perfect. Glumes persistent, membranous, 1 to 3-nerved, keeled, acuminate ; *upper* longer. *Lower* 2 valves equal and very similar, oblong, emarginate, membranous, strongly laterally compressed, 5 to 7-nerved, keeled, hairy, awned, awn of the lower valve short from $\frac{1}{3}$ to halfway below the tip, of the upper longer, kneed, from near the base, rarely from the middle ; terminal valve much shorter than the lower two, broadly elliptic, very thin, delicately 7 to 1-nerved. Pales of the lower two florets, if present, 2-keeled, of the terminal 1-nerved. Lodicules 0. Stamens 3 in the male, 2 in the perfect florets. Styles distinct, long, stigmas long, exserted from the top of the spikelet, plumose. Grain ovoid, slightly laterally compressed ; hilum punctiform ; embryo $\frac{1}{4}$ the length of the grain.

Perennial or Annual ; blades flat, usually flaccid ; panicle slender, very narrow or spike-like, sometimes reduced to scanty racemes ; sweet scented. Species 15.

PLATE 188.

Anthoxanthum Ecklonii, Stapf. (Fl. Cap., Vol. VII., p. 466).

Nat. Order Gramineæ.

Perennial.—Culms tufted, erect, simple, 1 to 3 feet long, smooth, glabrous or scaberulous, finely striate, about 3-noded ; internodes gradually longer from the base, up to 1 foot or more long ; sheaths rather tight, smooth or scabrid, rarely reversedly hispidulous, striate, usually very much shorter than the internodes except the lowest, the basal one or two bladeless, acute ; ligules scarious, white, ovate, obtuse, 1 to 2 lines long ; blades linear, gradually tapering, acute, up to 3 inches by 1 to $1\frac{1}{2}$ line, the upper very short, rather rigid, glabrous, smooth or scabrid, rarely reversedly hispidulous, prominently many nerved.

Panicle erect, spike-like, sometimes interrupted near the base, up to 2 inches long, shiny, pallid ; rhachis glabrous ; pedicels with spreading hairs.

Spikelets oblong-lanceolate, $3\frac{1}{2}$ to 4 lines long, pallid.

Glumes lanceolate to ovate-lanceolate (in profile), acuminate, scaberulous on the keels, *lower* $2\frac{1}{2}$ to 3 lines long, 1-nerved, hyaline, *upper* $3\frac{1}{2}$ to 4 lines long, 3 (very rarely 1-) nerved, subhyaline. Florets, lowest male or barren ; valve about $2\frac{1}{2}$ lines long, 5-nerved, with a short straight awn from above the middle ; intermediate floret equal and very similar to the preceding, always empty, with a kneed awn 4 lines long from below the middle ; uppermost floret perfect, 1 to $1\frac{1}{4}$ line long ; valve 5-nerved ; anthers $1\frac{1}{4}$ to $1\frac{1}{2}$ line long ; grain $\frac{7}{8}$ line long.

Habitat : Natal. Riet Vlei, 4000-5000 feet alt., *Buchanan* 158.

Drawn from Buchanan's 158, the only specimen in the Herbarium.

Fig 1, Lower glume ; 2, upper glume ; 3, lowest valve ; 4, intermediate valve ; 5, upper valve ; 6, pale. *All enlarged.*

SPIKELETS laterally compressed in spike-like panicles; rhachilla glabrous or finely hairy, disarticulating above the glumes and between the valves, produced with or without a rudimentary valve. Florets 1-5, perfect, or the uppermost more or less reduced. Glumes 2, persistent, subequal or unequal, subacute to acuminate, keeled, the *lower* usually 1-nerved or like the upper 3-nerved, margins hyaline. Valves exceeding the glumes, acute or obtuse with the margins and tips broadly hyaline, 3-5-nerved; side nerves usually faint, conniving above, middle nerve percurrent or excurrent into a mucro or a short subterminal awn; callus very minute, glabrous. Pales shorter than the valves or almost as long, 2-keeled, 2-toothed, conspicuously hyaline and white. Lodicules 2, hyaline. Stamens 3. Ovary glabrous; styles distinct, very short, stigmas laterally exserted, plumose. Grain oblong, laterally compressed, whitish, soft, tightly embraced by the hardened back of the valve; hilum basal, short, obscure; embryo small.

PERENNIAL OR ANNUAL.—BLADES usually very narrow; ligules hyaline. Panicle usually cylindric, often interrupted, glabrous and glistening from the hyaline white margins of the valves and pales, or more or less hairy.

Species 12 to 15, mainly in Europe, North Africa, and temperate Asia, one species almost cosmopolitan.

PLATE 189.

KŒLERIA CRISTATA, Pers. (Fl. Cap., Vol. VII., p. 468).

Nat. Order Gramineæ.

PERENNIAL, densely cæspitose.—CULMS erect, rarely geniculately ascending, 6 inches to more than 1 foot long, glabrous or villous, pubescent, 1-2-noded, upper internodes very long, exserted.

LEAVES crowded near the base; sheaths rather tight, striate, glabrous or pubescent to villous, the *lower* more or less persistent; ligule obtuse, minutely ciliolate, rarely more than $\frac{1}{2}$ line long, usually produced into lateral auricles; blades linear, acute, from 1 inch to 1 foot long, to 1 line broad, flat, soft and even flaccid, or setaceously convolute and flexuous or rigid, glabrous and smooth below, pubescent above, or ciliate, or pubescent to villous all over.

PANICLE cylindric, often interrupted or lobed, 1 to 4 inches, by $2\frac{1}{2}$ to 6 lines, dense; branches repeatedly and very shortly branched from the base, like the rhachis pubescent to minutely villous; pedicels very short.

SPIKELETS 2 to $2\frac{1}{2}$ lines long, 2-3-flowered.

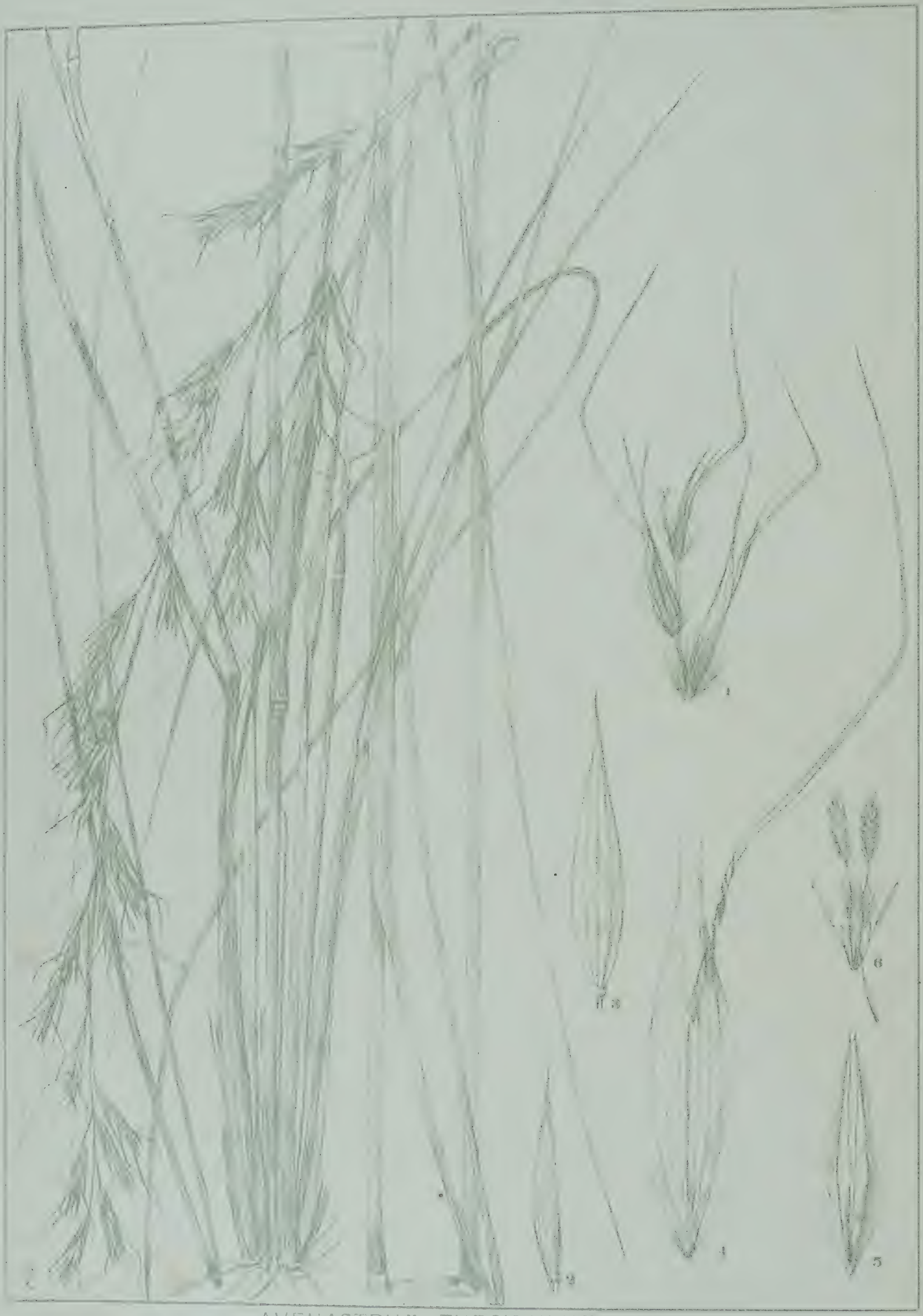
GLUMES glabrous or pubescent, the *lower* narrow, lanceolate, subacute to acute, $1\frac{1}{4}$ to $1\frac{3}{4}$ line long, 1-nerved, the *upper* much broader, subacute to acutely acuminate, $1\frac{1}{2}$ to $2\frac{1}{4}$ lines long, 3-nerved. Valves oblong to lanceolate in profile, subobtuse to acuminate, sometimes mucronulate, $1\frac{3}{4}$ to 2 lines long, glabrous or pubescent; lodicules 2-3-lobed or toothed; anthers $\frac{3}{4}$ to 1 line long; grain up to $1\frac{1}{4}$ line long.

Habitat: NATAL. *Buchanan* 95, 157; Van Reenen, 5000-6000 feet alt., December, *Wood* 7215a.

Baron F. v. Mueller says of this grass: "Widely dispersed over the globe. A perennial grass of fair nutritive quality, sustains itself on dry soil." Another authority says: "Of no agricultural value, and rejected by cattle."

Fig 1, Spikelet with glumes removed; 2, lower glume; 3, upper glume; 4, valve; 5, pale; 6, stamens and lodicules. *All enlarged.*

KOELERIA CRISTATA. *PERS*



AVENASTRUM TURGIDULUM. *STAPF*

Avenastrum, Jess.

Spikelets usually erect or suberect, rarely nodding, medium-sized (4 to 7 lines long, rarely less or more), in nearly always erect, often stiff panicles; rhachilla more or less long-hairy, disarticulating above the glumes and between the valves, produced into a short bristle beyond the uppermost floret or ending with a rudimentary valve. Florets 3 to 6, perfect, or the uppermost more or less reduced. Glumes 2, persistent, scarious, more or less unequal, acute or acuminate, more or less distinctly keeled, *lower* 1 or 3-nerved, *upper* 3 (very rarely 5 to sub-7) nerved. Valves usually distinctly exserted from the glumes, more or less herbaceous with scarious or hyaline tips, often rather firm, acute or acuminate, bifid, with or without bristles from the lobes, 5 to 9-nerved, awned; awn dorsal from the middle or slightly above it, kneed and twisted below; callus short or elongate, villous. Pales shorter than the valves, 2-keeled, 2-toothed or bifid. Lodicules 2, rather large, hyaline. Stamens 3. Ovary hairy from the middle upwards or at the top only; styles distinct, short; stigmas laterally exserted, plumose. Grain oblong, slightly laterally compressed, usually grooved in front, hairy at the top, pallid, rather soft, embraced by the somewhat hardened valve and the pale; hilum linear, up to half the length of the grain; embryo small.

Perennials, cæspitose; blades linear, usually narrow, flat or convolute, often setaceous; ligules hyaline. Panicle narrow, erect, often stiff, rarely flaccid or expanded.

PLATE 190.

Avenastrum turgidulum, Stapf. (Fl. Cap., Vol. VII., p 474).

Nat. Order Gramineæ.

Culms 1 to $2\frac{1}{2}$ feet long, glabrous, 2 to 3-noded, *upper* 2-3 internodes more or less exserted, uppermost finally long exserted.

Leaves usually very few near the base, about 3 higher up; sheaths terete, rather tight, very minutely puberulous or glabrous; ligule truncate, up to $\frac{3}{4}$ line long; blades linear, tapering to an acute point, up to 6 inches, by $1\frac{1}{2}$ line, flat or involute, subflaccid or more or less rigid, subglaucous, glabrous, rarely scantily hairy, scaberulous above.

Panicle contracted, erect or slightly nodding, $\frac{1}{2}$ to 1 foot, long; branches fascicled, very unequal, the longer up to $1\frac{1}{2}$ inch long, scantily branched or simple, erect or a few spreading, filiform, scabrid.

Spikelets 4 to $5\frac{1}{2}$ lines long, greenish, compactly 3-4-flowered; rhachilla slender, joints up to 1 line long, bearded near the tips.

Glumes lanceolate, acuminate, the *lower* $2\frac{1}{2}$ to 3 lines, the *upper* 4 to $4\frac{1}{2}$ lines long. Valves exserted, oblong-lanceolate, the lowest $3\frac{1}{2}$ to 4 lines long, glabrous, light green, slightly purplish below the tips; obscurely granulated, tips scarious, 2-toothed, teeth produced into fine bristles 1 to $1\frac{1}{2}$ line long; callus bearded, very short; awn from the middle, rather fine, column $2\frac{1}{2}$ to 3 lines long, bristle 5 to 6 lines long Pales 3 lines long, keels ciliate; anthers $\frac{1}{2}$ to 1 line long; ovary pubescent from the middle, top hispidulous Grain $1\frac{1}{4}$ line long.

Habitat: Natal. Umsinga and foot of Biggarsberg, *Buchanan* 100; near Greytown, *Buchanan* 172; Riet Vlei, *Buchanan* 156; near Maritzburg, *St. George* 14 (*Wood* 7228).

Drawn from Buchanan's 156.

Fig 1, Spikelet, glume removed; 2, lower glume; 3, upper glume; 4, valve; 5, pale; 6, pistil, stamens and lodicules. *All enlarged.*

PLATE 191.

AVENASTRUM CAFFRUM, Stapf. Var (?) natalensis, Stapf. (Fl. Cap., Vol. VII., p. 477).

Nat. Order Gramineæ.

CULMS 2 feet long, glabrous, 3 to 4-noded, sheathed to the base of the panicle.

LEAVES 4 to 6 near the base, 3 higher up; sheaths tight below, loose or open above, glabrous; ligule oblong, up to $\frac{3}{4}$ line long; blades very narrow, subsetaceous, convolute, the *lower* 5 to 7 inches long, those of the barren shoots to 1 foot long, glabrous, closely and strongly few-nerved, margins rough.

PANICLE contracted, about 6 inches long, slightly nodding and subflaccid; rhachis filiform; branches fascicled, very unequal, the longest up to 2 inches long, sparingly branched or simple, finely filiform, flexuous, erect, scaberulous to finely hispidulous.

SPIKELETS 4 to $4\frac{1}{2}$ lines long, loosely 3 to sub-4-flowered; rhachilla joints very slender, up to 1 line long, with long white hairs.

GLUMES very thin, lanceolate, acuminate, often aristulate, the *lower* 2 to $2\frac{1}{2}$ lines, the *upper* $2\frac{1}{2}$ to $3\frac{1}{2}$ lines long. Valves exserted, linear-lanceolate, the lowest 3 to 4 lines long, glabrous, pallid, rather thin, smooth, faintly nerved, tips scarious, sub-bifid, produced into short, fine bristles; callus $\frac{1}{4}$ line long, bearded; awn from above the middle, fine, pallid, column $2\frac{1}{2}$ to 2 lines long, bristle 5 lines long. Pales 3 lines long; keels minutely ciliolate. Anthers up to $\frac{1}{2}$ line long; ovary top hispidulous.

VAR (?) NATALENSIS, Stapf.—Internodes exserted, very minutely puberulous below the nodes. Leaves up to 2 lines broad, flat or involute, subflaccid, more or less hairy above. Spikelets rather smaller than in the typical form.

Habitat: NATAL. *Var. natalensis*, Riet Vlei, 4000 to 5000 feet alt., *Buchanan* 238.

Drawn from Buchanan's 238, the only specimen in the Herbarium.

Fig 1, Spikelet, glumes removed; 2, lower glume; 3, upper glume; 4, valve; 5, pale; 6, pistil, stamens and lodicules. *All enlarged.*

AVENASTRUM CAFFRUM. *STAPF.*

Var: (?) Natalensis, Stapf.

PENTASCHISTIS NATALENSIS, *STAPF*

Pentaschistis, Stapf.

Spikelets from slightly over 1 line to 6 lines long, very rarely longer, laterally compressed, pedicelled, panicled; rhachilla disarticulating above the glumes and between the valves, continued as a usually very minute bristle beyond the upper floret. Florets 2, hermaphrodite, much shorter than the glumes. Glumes equal or subequal, lanceolate in profile, acuminate, keeled, hyaline or subhyaline, 1-nerved or closely 3-nerved at the very base. Valves membranous, hairy, with the hairs seriate between the nerves, or glabrous excepting the always shortly hairy small callus, finely or obscurely 5 to 9-nerved, 2-lobed, awned from the sinus; lobes with a fine bristle from the inner angle, to which they are usually more or less adnate or pass into sometimes very small, rarely 3 to 4-fid with all the divisions bristle-like. Pales 2-keeled, 2-toothed, more or less equalling the valves (exclusive of the lobes). Lodicules 2, small, cuneate, nerved, usually glabrous. Stamens 3. Ovary oblong, glabrous; styles distinct, very slender; stigmas plumose, laterally exserted. Grain oblong, semiterete to subterete, shallowly grooved in front; hilum obscure, linear-oblong, $\frac{1}{4}$ to $\frac{1}{3}$ the length of the grain; embryo about $\frac{1}{4}$ the length of the grain.

Perennial, rarely annual. Leaves very variable. Panicle usually distinctly trichotomous with swollen and often bearded axils, open or contracted, sometimes spike-like. Spikelets more or less glistening

Species over 40, mainly in South, a few in tropical Africa, 1 in Madagascar, and 1 in St. Paul's Island.

PLATE 192.

Pentaschistis natalensis, Stapf. (Fl. Cap., Vol. VII., p. 493).

Nat. Order Gramineæ.

Perennial.—Culms densely tufted or erect from short stolons, rather slender, 2 feet high, glabrous, smooth, 4 to 5-noded, sheathed all along; sheaths tight, striate, softly hairy or the upper glabrous; mouth shortly bearded; ligule a fringe of hairs; blades very long, filiform-convolute, *lower* up to more than 1 foot long by $1\frac{1}{2}$ line wide at the base, glabrous or scantily hairy towards the base, smooth, margins scaberulous.

Panicle open, very lax, up to 6 inches by 6 inches, somewhat flaccid; branches 2-nate, smooth like the filiform axis and the subcapillary or capillary branchlets and pedicels, glabrous, except the sparingly hairy callous axils, very laxly and spreadingly di- and trichotomous from $\frac{1}{2}$ to $1\frac{1}{2}$ inch above the base, lowest over 3 inches long, ultimate divisions and pedicels rather short; lateral pedicels about $1\frac{1}{2}$ line long.

Spikelets very pallid, 3 to $3\frac{1}{4}$ lines long.

Glumes lanceolate in profile, finely acuminate, hyaline, glabrous, 1-nerved, keel minutely tubercled. Valves linear-oblong, body $1\frac{1}{2}$ line long, finely and loosely hairy all over, finely 7-nerved; lobes short, acute, adnate to or more or less free from the fine bristle, 2 to $2\frac{1}{2}$ lines long at the inner side; awn about 6 lines long, kneed and twisted just below the middle; callus short, acute, minutely villous; pales equalling the valves, 2-toothed, tips ciliolate; anthers 1 line long; grain slightly over 1 line long.

Habitat: Natal Riet Vlei, 5000-6000 feet, *Buchanan* 283; Karkloof, 4000-5000 feet, April, *Wylie* (*Wood* 6006).

Fig 1, Glume; 2, valve; 3, pale with ovary and lodicules; 4, pistil. *All enlarged.*

PHRAGMITES, TRIN. (Partly).

SPIKELETS loosely 3 to 10-flowered, awnless, in large panicles; rhachilla disarticulating above the first and between the following valves, slender, glabrous, joints very short. Florets, the lowest male or abortive, the following hermaphrodite, the uppermost reduced. Glumes thin, unequal to subequal, lanceolate, acute, more or less rounded on the back, 3-nerved, or the lowest sometimes sub-5-nerved. Valves heteromorphous, the lowest linear-lanceolate, much longer than the subtending glume, otherwise of a similar structure, quite glabrous, persistent, the following valves very thin, linear, long and more or less caudate-acuminate, 3-nerved, middle nerve percurrent, side nerves fine, short, callus long, slender, with very long silky hairs. Pales linear-oblong, about half as long as the valves, 2-keeled. Lodicules 2 (or sometimes 3 in the lowest floret), obovate, 2-3-nerved, glabrous. Stamens 3, or 2 in the lowest floret. Ovary glabrous, in the lowest floret rudimentary or quite suppressed; styles distinct, rather short; stigmas laterally exserted, densely plumose. Grain loosely enclosed by the valve and pale, free, oblong, semiterete, hilum oblong, short, basal; embryo about half as long as the grain.

PERENNIALS with a creeping rhizome, extravaginal innovation shoots, and tall sheathed annual or perennial culms. Blades flat; ligule a narrow, ciliate, membranous rim. Panicle lax, usually very large and much compound. Spikelets conspicuously silky from the long callus hairs.

Species 1 (or 2, very closely allied), almost cosmopolitan.

PLATE 193.

PHRAGMITES COMMUNIS, Trin. (Fl. Cap., Vol. VII., p. 541).

Nat. Order Gramineæ.

CULMS erect, 4 to 10 feet long, sometimes much taller or dwarfed, annual, many noded, usually sheathed all along; sheaths embracing each other, tight, terete, smooth, glabrous, the lowest with reduced blades or bladeless, firm.

BLADES linear to lanceolate, tapering to a setaceous or subulate point, very variable in length and width (up to $1\frac{1}{2}$ foot long and $\frac{1}{2}$ to $1\frac{1}{2}$ inch broad in the South African specimens), firm, more or less glaucous below, glabrous, smooth or slightly rough towards the base, margins smooth or scabrid.

PANICLE oblong to ovate-oblong, erect or nodding, more or less secund, dense or rather lax, $\frac{1}{2}$ to $1\frac{1}{2}$ foot long (in the South African specimens), brownish-purple or brownish-yellow, branched, fascicled or the upper solitary, the longest $\frac{1}{2}$ to $\frac{3}{4}$ foot, loosely and repeatedly branched, like the rhachis angular and scabrid, ultimate branchlets more or less terete, filiform; lateral pedicels usually 1 to 2 lines long, the terminal up to 4 lines long.

SPIKELETS 6 to 8 lines long (in the South African specimens).

GLUMES, $\frac{1}{2}$ to $2\frac{1}{2}$ lines and 2 to $3\frac{1}{2}$ lines long respectively. Valves *lower* oblong-linear, like the following valves 2 to $6\frac{1}{2}$ lines long, callus to $\frac{3}{4}$ line, hairs to 3 lines; anthers about 1 line long; grain $\frac{3}{4}$ line long.

Habitat: NATAL. Common through the Colony, *Buchanan* 273; near Durban, *Cooper* 3354; Inanda, Umhlanga valley, *Wood* 1335.

Almost cosmopolitan.

Fig 1, Lower glume; 2, upper glume; 3, lower valve; 4, upper valve; 5, pale; 6, stamens, pistil and lodicules. *All enlarged.*

PHRAGMITES COMMUNIS. *TRIN*

POLYPOGON MONSPELIENSIS. *DESF*

Polypogon, Desf.

Spikelets 1-flowered, in dense spike-like, often lobed, panicles, disarticulating from the pedicels; rhachilla disarticulating below the valve, not produced, flower hermaphrodite. Glumes 2, subequal, awned from the entire or 2-lobed tips. Valve shorter than the glumes, very thin to hyaline, glabrous, truncate, faintly or obscurely 5-nerved, the lateral nerves shortly excurrent or evanescent within the hyaline tips; awn very fine, usually deciduous, subterminal, sometimes reduced to a mucro or 0. Pale 2-keeled, slightly shorter than the valve, rarely much shorter. Lodicules 2, delicate. Stamens 3. Ovary glabrous; styles distinct, very short; stigmas laterally exserted, loosely plumose. Grain oblong, subterete or slightly grooved, enclosed by the unaltered valve and pale; hilum short; embryo small.

Annual or subperennial; blades flat, uppermost sheath often tumid. Spikelets 1 to 2 lines long, often hidden by the numerous awns.

Species about 8; 4 in America, 1 in Africa, the others widely dispersed over the warm regions of both hemispheres.

PLATE 194.

Polypogon monspeliensis, Desf. (Fl. Cap., Vol. VII., p. 543).

Nat. Order Gramineæ.

Annual, tufted.—Culms erect or geniculately ascending, $\frac{1}{2}$ to 2 feet long, simple, glabrous, smooth, 3-4-noded, nodes exserted or enclosed; sheaths loose, often tumid, glabrous, smooth; ligules scarious, oblong, denticulate, ciliolate, $1\frac{1}{2}$-3 lines long; blades linear, tapering to a callous point, 2-6 inches by 1-3 lines, flaccid to subrigid, flat, scabrid.

Panicle spikelike, cylindric, sometimes lobed or interrupted below, 1-5 inches long, light green or straw-coloured; branches with numerous branchlets from the base, scaberulous; lateral pedicels extremely short, disarticulating near the base.

Spikelets 1 line long.

Glumes subequal, linear or oblanceolate-oblong, shortly 2-lobed or emarginate, scaberulous, ciliate or ciliolate; awn 2-3 lines long. Valve $\frac{1}{2}$ line long, minutely 2-4-mucronulate, nerves very obscure, awn as long as the valve or shorter or 0. Pale 2-toothed or 2-mucronulate, almost as long as the valve. Anthers $\frac{1}{5}$-$\frac{1}{4}$-line long. Grain oblong, $\frac{1}{2}$ line long, subterete or terete, obscurely grooved.

Habitat : Natal. *Cooper* 3520.

Drawn from Cooper's 3520, the only specimen in the Colonial Herbarium.

Fig 1, Glume; 2, valve; 3, pale. *All enlarged.*

SPIKELETS from less than 1 line to $2\frac{1}{2}$ lines long, panicled; rhachilla not continued beyond the floret or produced into a minute point or short delicate bristle, glabrous or shortly hairy. Floret 1, hermaphrodite, shorter than the glumes. Glumes equal or subequal, usually lanceolate and acute, rarely oblong and obtuse, awnless (except in A. polypogonoides), membranous, usually 1-nerved, keeled. Valve broadly oblong, delicately membranous, glabrous or hairy, usually truncate, 5- (rarely 3-) nerved awned from the back or awnless; side-nerves evanescent below, often excurrent into fine mucros or bristles; callus very small, glabrous or minutely hairy or rarely bearded. Pale delicate, hyaline, usually shorter than the valve or very short or obsolete, 2-nerved or nerveless. Lodicules 2, lanceolate, delicately hyaline. Stamens 3. Ovary glabrous; styles distinct, very short; stigmas plumose, laterally exserted. Grain free, enclosed in the scarcely altered floret, oblong, more or less dorsally compressed, grooved in front, rarely subterete; embryo short; hilum punctiform, basal.

ANNUALS OR PERENNIALS, of varying habit; blades usually flat, often flaccid; ligules membranous; panicle usually much divided, often delicate, more or less effuse or contracted, rarely spike-like; branches and branchlets fine to very fine; spikelets usually very numerous, much gaping, at least temporarily.

Species numerous all over the world, but mostly in the temperate regions.

PLATE 195.

AGROSTIS NATALENSIS, Stapf. (Fl. Cap., Vol. VII., p. 548).

Nat. Order Gramineæ.

PERENNIAL, tufted, 2 to 3 feet high, glabrous.

CULMS erect, 5 to 6-noded, smooth; leaf-sheaths rather tight, smooth; ligule $\frac{1}{2}$ to $\frac{3}{4}$ line long; blades narrowly linear, tapering to a fine point, 3 to 7 inches, by $\frac{1}{2}$ to 1 line, flat, flaccid, minutely asperulous or almost smooth.

PANICLE erect, spike-like, lobed, 4 to 7 inches long, branches in distant, very dense oblong fascicles, very unequal, up to $1\frac{1}{2}$ line long, branched from the base, or the longest some way above it, scaberulous, pedicels very short.

SPIKELETS light green, $2\frac{1}{2}$ lines long, narrow; rhachilla not produced.

GLUMES subequal, linear-oblong, mucronate, scaberulous, keels scabrid. Valve oblong, truncate, 4-mucronate, 1 line long, smooth, 5-nerved at the base, 4-nerved above; callus minutely hairy in front; awn straight, tapering towards both ends, scabrid, from above the base, 1 line long. Pale subquadrate, hyaline, denticulate, $\frac{1}{4}$-$\frac{1}{3}$ line long. Anthers $\frac{1}{2}$ line long, apiculate. Grain oblong, dorsally compressed, grooved, $\frac{7}{8}$ line long.

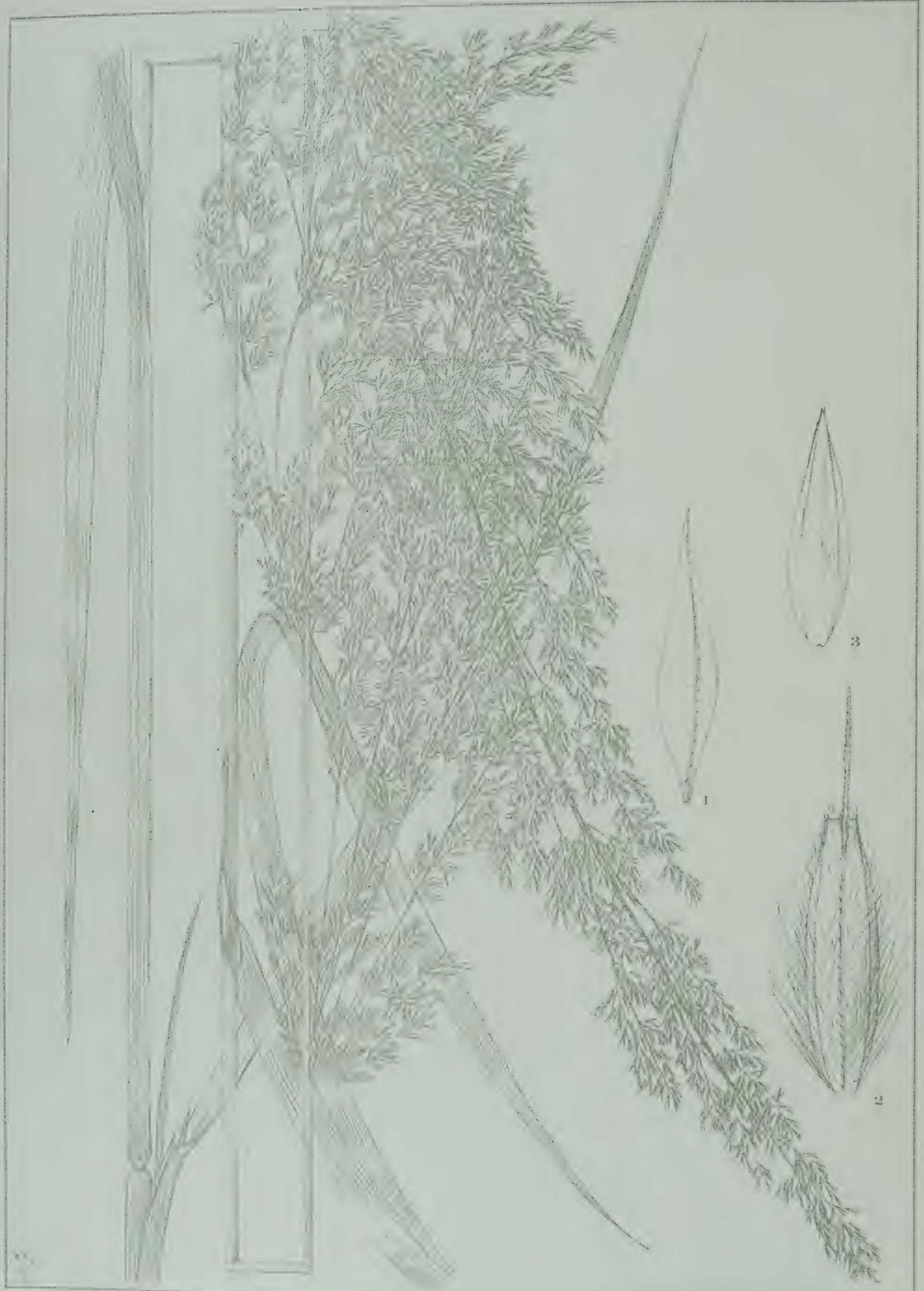
Habitat: NATAL. Umpumulo, 2000 feet alt., *Buchanan* 159.

Allied to *A. Elliotii*, Hack, from Madagascar, but differing in having somewhat larger spikelets, shorter and broader valve, and truncate pale.

Drawn from Buchanan's 159, the only specimen in the Herbarium.

Fig 1, Glume; 2, valve. *Both enlarged.*

AGROSTIS NATALENSIS. *STAPF.*



AGROSTIS LACHNANTHA, *NEES.*

PLATE 196.

AGROSTIS LACHNANTHA, Nees. (Fl. Cap., Vol. VII., p. 549).

Nat. Order Gramineæ.

PERENNIAL OR ANNUAL, glabrous.

CULMS erect or geniculate-ascending, $\frac{1}{2}$ to 2 feet long, smooth or scaberulous below the nodes, 2 to 4-noded; leaf-sheaths minutely scaberulous; ligule 1 to $2\frac{1}{2}$ lines long; blades linear, tapering to an acute point, $1\frac{1}{2}$ to 8 inches by 1 to 2 lines, green or subglaucous, flat, flaccid, scaberulous on both sides.

PANICLE contracted, narrow, 2 to 12 inches long, erect, branches very unequal, in distant fascicles, the longest up to 4 inches, or all very short, capillary, erect or flexuous, scabrid, branched from the base or the longer ones simple for $\frac{1}{2}$ to 1 inch; pedicels mostly as long as or shorter than the spikelets, the latter light green, $\frac{3}{4}$ to $1\frac{1}{4}$ line long, shining; rhachilla not produced.

GLUMES subequal, lanceolate, acutely subacuminate, keels rather stout, scabrid; valve oblong, truncate, $\frac{5}{8}$ to 1 line long, hairy, often only along the side-nerves, rarely glabrous, 3-nerved, sometimes mucronate; callus scantily bearded; pale $\frac{1}{2}$ to $\frac{3}{4}$ line long; anthers $\frac{1}{4}$ line long; grain oblong, $\frac{1}{2}$ line long.

Habitat: NATAL. Umpumulo, 2000 feet alt., common by streamlets, *Buchanan* 280; Riet Vlei, 4000 to 5000 feet alt., *Buchanan* 286; marshy ground near Mooi River, 4000 feet alt., *Mason* 51, 65, 69.

Also in Abyssinia. A very variable plant, so far as size and habit are concerned.

Fig 1, Glume; 2, valve; 3, pale. *All enlarged.*

Aristida, Linn.

Spikelets 1-flowered, narrow, panicled, rhachilla disarticulating above the glume, not produced. Glumes usually persistent, narrow, 1-3-nerved, muticous or mucronate, awnless. Valve convolute, cylindric or oblong-cylindric, 3-nerved, awned, rather rigid, tips gradually tapering or minutely bilobed, sometimes jointed at or above the middle; callus villous, shortly bearded, usually pungent; awn nearly always 3-partite from the base or above the simple base (stipitate) very rarely simple, continuous with the valve or disarticulating from it or deciduous with a portion of the valve, foot straight or twisted, bristles plumose or the lateral or all naked. Pale small oblong, 2-nerved or nerveless. Lodicules 2, finely nerved. Stamens 3. Ovary glabrous; styles distinct, short; stigmas plumose, laterally exserted. Grain slender, cylindric or oblong-cylindric, terete, sometimes grooved, tightly embraced by the valve; hilum linear, almost as long as the grain; embryo short or long.

Annual or more often perennial, tufted, usually with more or less wiry culms; blades narrow, usually convolute; ligule usually a line of very short hairs; panicle varying from spike-like to effuse.

Numerous species in the dry and warm regions of both hemispheres.

PLATE 197.

Aristida æquiglumis, Hack. (Fl. Cap., Vol. VII., p. 555).

Nat. Order Gramineæ.

Perennial, densely cæspitose, glabrous.

Culms very slender, terete, erect, simple, wiry, 1 to $1\frac{1}{4}$ foot long, smooth, about 3-4-noded, internodes exserted; sheaths very tight throughout, smooth; ligule a minutely ciliolate rim.

Blades setaceously convolute, fine, 2 to 4 inches long, firm, strongly curved, smooth below, minutely puberulous on the upper surface, margins scabrid.

Panicle linear-oblong, contracted, or somewhat open and lax, 3 to 4 inches long; rhachis filiform, smooth or subscaberulous; branches remotely 2 or 3-nate, or the upper solitary, erect or oblique, longest up to more than 2 inches long and sparsely divided from the middle, the others almost simple, subcapillary, scaberulous; branches 1 to 3 spiculate; lateral pedicels very short.

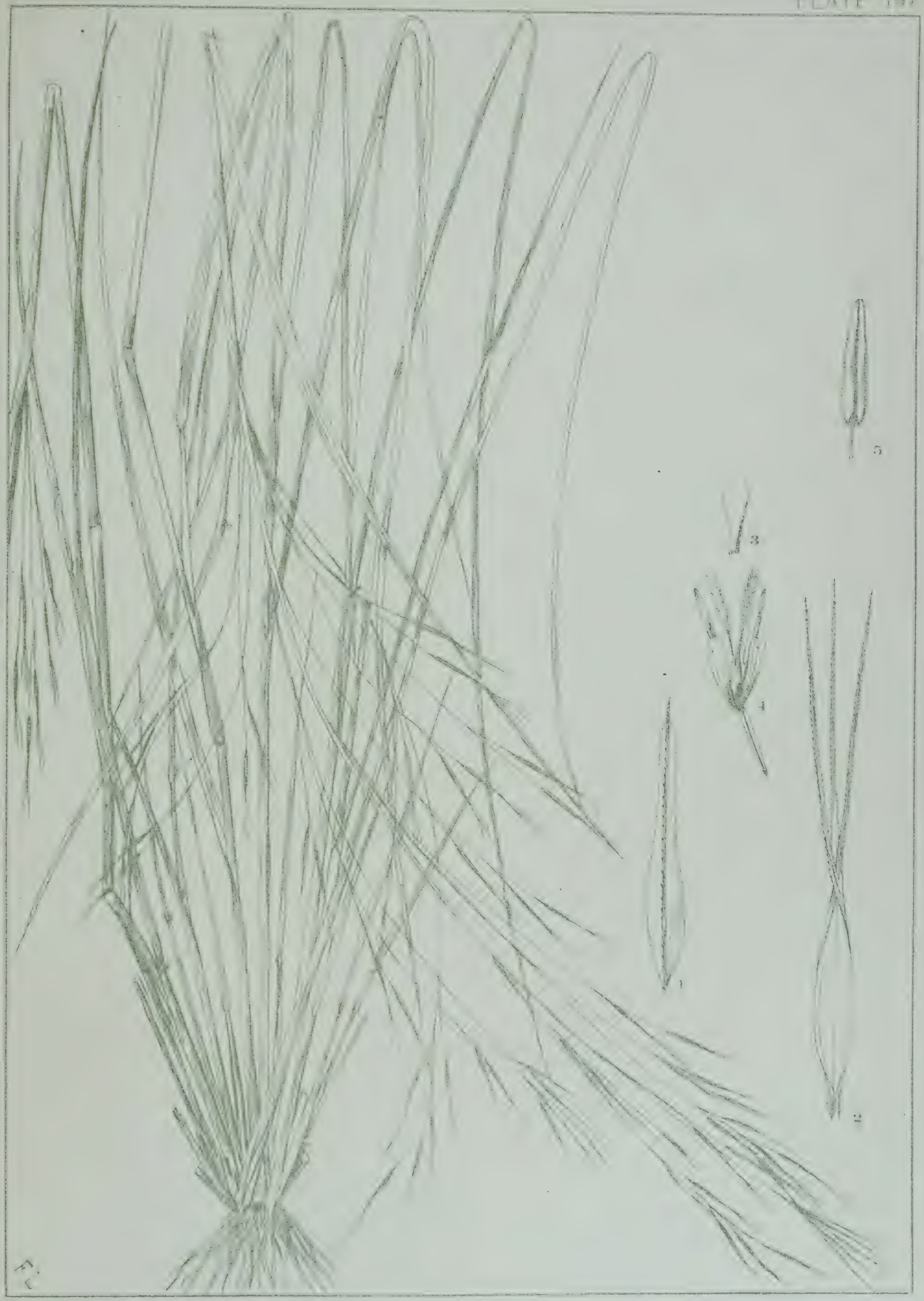
Spikelets straw-coloured or tinged with purple, 4 to 5 lines long.

Glumes equal or subequal, lanceolate-linear, shortly mucronate from the minutely 2-toothed tips, 1-nerved. Valve linear-convolute, $3\frac{1}{2}$ lines long, produced into an often slightly exserted and more or less twisted almost solid scabrid beak, minutely scaberulous below it, violet; awns continuous with the valve, capillary, suberect, scaberulous, about 10 to 15 lines long; pale oblong, acute, slightly over $\frac{1}{2}$ line long; lodicules about as long as the pale.

Habitat: Natal. Near Maritzburg, *T. J. St. George* No. 10 (*Wood* 7232).

In the Flora Capensis, Natal is not credited with this species, Transvaal localities only being quoted.

Fig 1, Glume; 2, valve; 3, pale; 4, pistil, stamens and lodicules; 5, anther. *All enlarged.*



ARISTIDA AEQUIGLUMIS. *HACK.*

ARISTIDA ANGUSTATA. *STAPF.*

ARISTIDA ANGUSTATA. *STAPF.*

PLATE 198.

ARISTIDA ANGUSTATA, Stapf. (Fl. Cap., Vol. VII., p. 556).

Nat. Order Gramineæ.

PERENNIAL, densely cæspitose, light green or glaucous.

CULMS very slender, terete, erect, simple or very scantily branched, wiry, 1 to $1\frac{1}{2}$ foot long, about 3-noded, internodes exserted; sheaths very tight, often slightly widened at the base, the *lower* sometimes woolly.

BLADES setaceously convolute, rather fine, up to $\frac{3}{4}$ foot long, curved or flexuous, smooth below, densely pubescent or hispidulous and almost white above.

PANICLE very narrow, often spike-like, 2 to 4 inches long; rhachis straight or flexuous; branches solitary, the longest up to $1\frac{1}{4}$ inch long, scantily branched; branchlets filiform; lateral pedicels very short.

SPIKELETS yellowish, $4\frac{1}{2}$ to $5\frac{1}{2}$ lines long.

GLUMES unequal, oblong-linear, usually shortly mucronate, the *lower* 2 to $3\frac{1}{2}$ lines long, acute, the *upper* about 4 lines long, acute or minutely truncate. Valve linear, convolute, produced into a short or usually very short beak (when of sufficient length to be slightly exserted then more or less twisted), scaberulous below the beak; callus $\frac{1}{4}$ line long; awns continuous with the valve, divaricate, 5 to 7 lines long, fine; pale hyaline, $\frac{2}{3}$ line long; lodicules 5-nerved, $\frac{7}{8}$ line long; anthers $1\frac{1}{2}$ to 2 lines long, not apiculate.

Habitat: NATAL. Near Dundee, 4000-5000 feet alt, March, *W. E. Green* 112a; near Ladysmith, 3000 feet alt., December, *Wood* 9100

In the dried state at least the nodes of this plant are very dark in colour, and contrast very strongly with the pale yellow culms.

The only South African habitats given in the Flora Capensis for this plant are Cape Colony and Transvaal.

Fig 1, Spikelet; 2, lower glume; 3, upper glume; 4, valve; 5, pale; 6, pistil, stamens and lodicules. *All enlarged.*

PLATE 199.

ARISTIDA JUNCIFORMIS, Trin. & Rupr. (Fl. Cap., Vol. VII., p. 556).

Nat. Order Gramineæ.

PERENNIAL, loosely cæspitose, sometimes stoloniferous. Rhizome slender, oblique or creeping, covered like the innovation-buds with imbricate, short ovate acute or pungent scales.

CULMS fascicled, erect, 1 to $1\frac{1}{2}$ foot long, slender, usually branched, glabrous, compressed below, wiry, 3 to 4-noded, internodes exserted, culm-nodes slightly swollen and sometimes protruding above the obscure sheath-nodes; sheaths tight, the *lower* keeled, often slipping from the stem and rolling in, glabrous or villous.

BLADES very narrow, gradually passing into the sheaths, subsetaceous, acute, up to 1 foot long, rigid, convolute or folded below, curved or flexuous, smooth below, minutely scaberulous above.

PANICLE narrow, 2 to 6 inches long, erect or nodding; rhachis angular; branches fascicled, erect, flexuous or nodding, the lowest $\frac{1}{2}$ to 2 inches long, often undivided for 1 inch or more, filiform to capillary, scaberulous; lateral pedicels short or almost 0.

SPIKELETS light green to yellowish, 2-3 near the tips of the branchlets, $3\frac{1}{2}$ to $4\frac{1}{2}$ lines long.

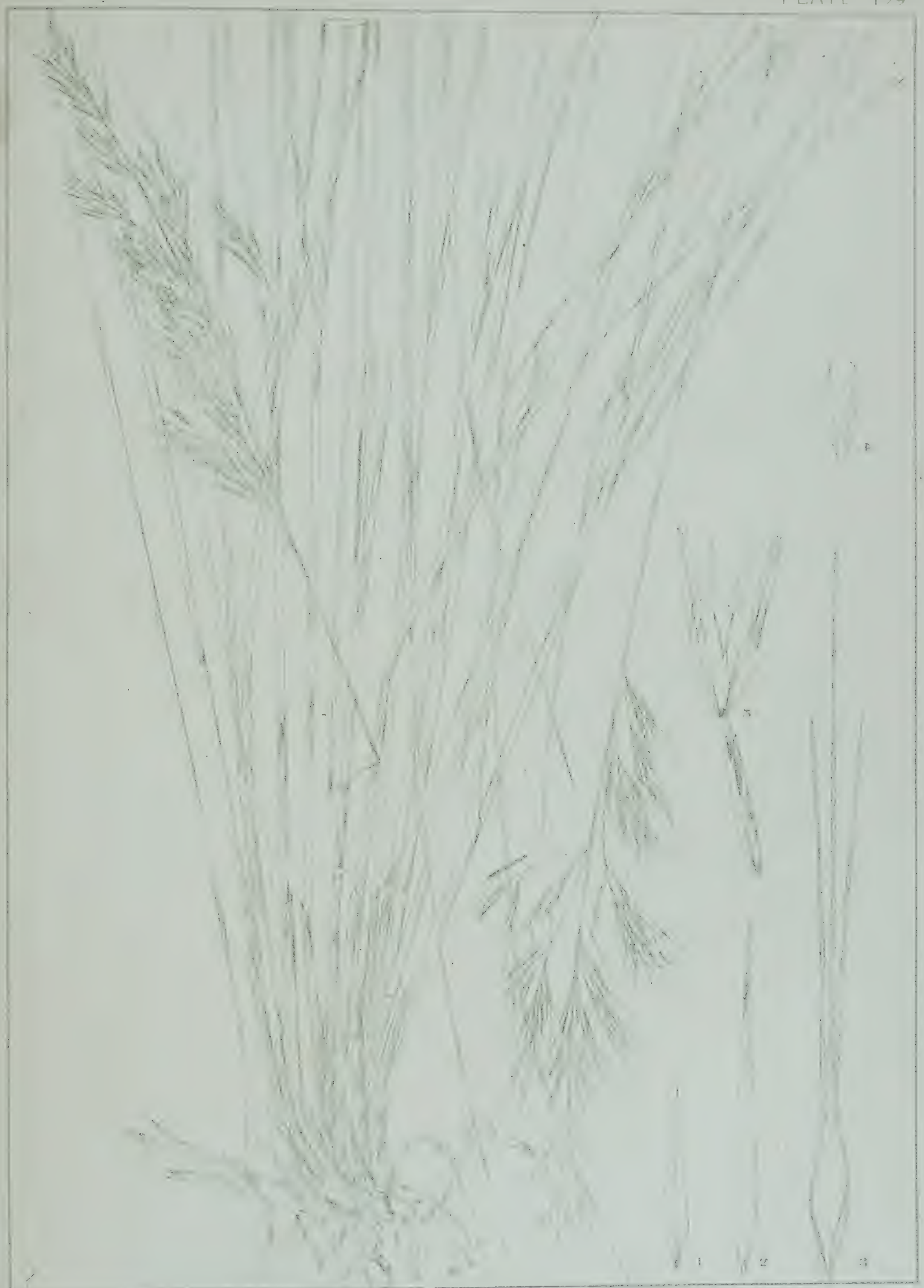
GLUMES unequal, thin, acute or subacute, 1-nerved, nerve excurrent into a fine bristle, 1 to $1\frac{1}{2}$ line long, the *lower* lanceolate, 2 to $2\frac{1}{2}$ lines long, the *upper* sublinear. Valve linear, convolute, produced into a short slightly twisted beak, as long as the upper glume, smooth or scaberulous below the beak; callus obtuse; awns continuous with the valve, very fine, 7 to 15 lines long; pale $\frac{3}{8}$ line long; lodicules delicate, lanceolate, over $\frac{1}{2}$ line long; anthers 1 line long, not apiculate.

Habitat: NATAL. Coast line to 1000 feet alt., *Sutherland*; Kathlamba Mountains, *Sutherland*; Weston, Mooi River, *Rehmann* 7342; near Durban, *Williamson* 34; *Plant* 61; and without precise locality, *Buchanan* 1289; in the Lubeck Herbarium, *Drège* 4349; Karkloof, 3000-4000 feet alt., *Wylie* (*Wood* 6015); Clairmont, near Durban, *Wood* 6052.

Also in the Orange River Colony.

Fig 1, Lower glume; 2, upper glume; 3, valve; 4, pale; 5, pistil, stamens and lodicules. *All enlarged.*

ARISTIDA JUNCIFORMIS. *TRIN.*



ARISTIDA JUNCIFORMIS. *TRIN.*

PLATE 200.

ARISTIDA SCIURUS, Stapf. (Fl. Cap., Vol. VII., p. 557).

Nat. Order Gramineæ.

CULMS rather stout, over 3 feet long with a fugacious snow-white adpressed woolly indumentum below the nodes; sheaths long, tight, glabrous except for some wool near the mouth, striate, ligule a flake of fine wool; blades linear, acute, involute or setaceously convolute above, over 1 foot long, 2 lines broad near the base, smooth below, asperulous above.

PANICLE contracted, dense, 1 to $1\frac{1}{2}$ foot by 1 to $1\frac{1}{2}$ inch, erect; rhachis rather stout, smooth; branches fascicled, the lowest up to $\frac{1}{2}$ foot long, erect, remotely and repeatedly branched; branchlets filiform to capillary, scaberulous; lateral pedicels short.

SPIKELETS 2-3 at the tips of the branchlets, yellowish, 5 to 6 lines long, very slender

GLUMES very unequal, rather thin, minutely truncate or 2-toothed (when expanded), the *lower* lanceolate-oblong, acute, $2\frac{1}{2}$ lines long, the *upper* linear-oblong, 5 to 6 lines long; valve linear, 4 to 5 lines long, obscurely beaked, beak straight; callus very short; awns continuous with the valve, fine, scaberulous, 7 to 8 lines long; pale $\frac{2}{3}$ line long; lodicules few-nerved, $\frac{3}{4}$ line long; anthers 3 lines long, cells minutely apiculate.

Habitat: NATAL. Without precise locality, *Gerrard* 471, 161.

Fig 1, Lower glume; 2, upper glume; 3, valve; 4, pale; 5, pistil, stamens and lodicules. *All enlarged.*

Notes on Some of the Species.

Plate 119.—Andropogon Halepense, Brot. var effusus, Stapf.

In June, 1901, an assistant in the office of the Agrostologist of the United States of America was directed to make investigations, and to report on the methods used for the extermination of this grass in places "where it had become a pest." The report was published in pamphlet form, and the following is a summary :—

"Johnson grass is a tall, vigorous grass, closely related to the Sorghums, with a very strong system of long, jointed, underground stems, popularly known as roots. Each joint of this underground stem is capable of producing a new plant.

"It is a native of the tropics of the Old World, and was first introduced into this country as a hay grass in South Carolina about sixty years ago.

"It has spread rapidly throughout the entire south to the Pacific coast, and thence to British Columbia. It thrives best in rich, moist alluvial or irrigated soil, where it is also most difficult to eradicate.

"It is commonly spread by means of its seeds. They are widely scattered from hay, cut after the seed has matured, and are often planted with seed oats. The seeds are unharmed by passing through the digestive tract of animals, and are thus widely scattered in manure.

"The grass should never be allowed to ripen its seed in meadows, fields, or along roads, fences, or railways.

"It can be destroyed by hand labour, digging out the underground stems.

"Under field conditions, it is best killed by ploughing fallow land during hot, dry weather. The stems are thus exposed to the heat of the sun and soon killed. The same result follows the action of severe frosts.

"It can also be killed during the cultivation of a cotton crop by much extra hand labour.

"Various chemical substances have been tried, but none have thus far proved successful and economical.

"Johnson grass makes a very good quality of hay when cut when just in flower, and it may be profitably cultivated throughout the south for this purpose.

"Meadows should be broken up at least every third year to loosen the matted stems. It is not necessary to re-seed the meadows when thus treated.

"Cow peas may be sown in the grass when it is broken in the spring. When broken in the fall, oats may be used with it. It affords good pasture during summer when treated in the same way as meadows."

Our plant, it will be seen, is the variety "effusus," but from experience in the Botanic Gardens it will be found quite as difficult to eradicate as the type.

Plate 122.—Andropogon Nardus, Linn. var validus, Stapf.

Of this grass Baron F. v. Mueller says: "One of the lemon-scented grasses. . . . It yields an essential oil for condiment and perfumery, and is occasionally used for tea. Simmonds gives the export value of this oil as from Ceylon alone at £7,000."

Plate 124.—Andropogon Schoenanthus, Linn. var versicolor, Hack.

This is also one of the lemon grasses. It will live in arid places. The medicinal "Sirri Oil," is prepared from the root.

Plate 131.—Andropogon filipendulus, Hochst.

Baron F. v. Mueller says : "Much liked by pasture animals, grows readily in poor stony ground ; forms very large patches."

Plate 141.—Digitaria sanguinalis, Scop.

This is known as "Finger-grass" or "Crab-grass," and is said to be a useful pasture plant, and to succeed in swampy places and under shade. It is good as a sand-stay, but does not stand frost well, and in cold climates it is an annual. It can be propagated either by seeds or by division of the roots. Formerly known as Panicum sanguinale, Linn.

Plate 146.—Panicum Helopus, Trin. var glabrescens, K. Schum.

This grass is supposed to be poisonous to horses, but cattle are said not to be affected by it. The natives know it as "Sinande," and use the roots medicinally.

Plate 159.—Panicum proliferum, Lam. var longijubatum, Stapf.

Of the type species, Baron F. v. Mueller says : "Evidently one of the hardier species, particularly eligible for wet brackish ground. Vegetates luxuriantly in the hottest part of summer, the stems lengthening sometimes to 7 feet, soon bending, and then rooting from the lower joints, throwing out numerous shoots from them, which grow rapidly, allowing of repeated cutting. Stems thick, succulent, sweetish ; panicles to 2 feet long. Through all stages of its growth this grass is much relished by horses and cattle."

Plate 184.—Stenotaphrum glabrum, Trin.

Baron F. v. Mueller says of this grass : "It is perennial, creeping and admirable for binding sea-sand and loose soil of river banks, also for forming garden edges and for establishing a grass sward on lawns much subjected to traffic. Generally not liked by pasture animals, and for this reason all the more eligible for consolidating rolling coast sand. It kept alive in the hottest and driest region of Central Australia . . . . . it endures also some frost, even the tender portion of its blade, and has shown itself adapted for recently reclaimed swamp land."

Notes on the Drawings.

Plate 116.—Andropogon amplectens, Nees.

Fig 5 should be lower, not upper valve.

Plate 146.—Panicum Helopus, Trin.

Fig 1 should be upper glume, 1a lower glume.

Plate 150.—Panicum trichopus, Hochst.

Fig 6 is lower *valve*, not lower glume.

Plate 152.—Panicum æquinerve, Nees.

Fig 1, lower glume in our specimen is 7-, not 5-nerved as stated in text.

Plate 154.—Panicum zizanioides, H.B.K.

Fig 5, pale, should be acute as stated in text.

Plate 155.—Panicum deustum, Thb.

Fig 3, lower valve is shown acute, should be obtuse.

Plate 157.—Panicum lævifolium, Hack.

Fig 3, upper glume, and Fig 4, lower valve, should be obtuse, not acute as shown.

Plate 159.—Panicum proliferum, Lam. var.

Fig 1, lower glume is shown too flat.

Plate 166.—Axonopus semialatus, Hk. var.

Figures wrongly numbered, Fig 6 should be lower valve, Fig 3 upper valve.

Plate 169.—Setaria nigrirostris, Dur. and Schinz.

Fig 7, upper valve is 5-nerved, not clearly shown in drawing.

Plate 199.—Aristida junciformis, Trin.

Lodicules are sub-acute, not truncate as shown.

Plate 200.—Aristida Sciurus, Stapf.

Lodicules are rounded at apex, not truncate as shown in drawing.

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